Journal of the
Asiatic Society of Bengal

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JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL,

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THE SECRETARIES.

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"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted: and it will die away, if they shall entirely cease."

SIR WM. JONES.

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CONTENTS.

No. 293.

(Published 27th April, 1864.)

	Page
On the history of the Burmah Race.—By Lieut.-Colonel A. P. Phayre, C. B., Chief Commissioner of British Burmah, ...	1
Account of further intercourse with the Natives of the Andaman Islands, ...	31
Note on the Bactro-Pali Inscription from Taxila.—By Major-General A. Cunningham,...	35
Remarks on the "Lake of Clear Water" in the District of Bassein, British Burmah.—By E. O'Riley, Esq. F. G. S., Deputy Commissioner, Bassein, ...	39
Extract from a Report on the Dependency of Bustar.—By Capt. C. Glasfurd, Deputy Commr. of the Upper Godavery Districts, ...	44
Enumeration of the Hot Springs of India and High Asia.—By Robert de Schlagintweit, Esq., ...	49
Memorandum upon some ancient Tiles obtained at Pugán in Burma.—By Lt.-Col. A. P. Phayre, ...	57
Literary Intelligence, Correspondence, &c., ...	59
Proceedings of the Asiatic Society for the months of November and December, 1863 and January and February, 1864, ...	61
Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, for the months of August, September, October, November and December, 1863, ...	i

No. 294.

(Published 20th June, 1864.)

An Account of Upper Kásh-kár, and Chitrál, or Lower Kásh-kár, together with the Independent Afghan State of Panj-korah, including Tál-ásh.—By Capt. H. G. Raverty, 3rd Regt., Bombay, N. I.,...	125
On the System employed in Outlining the Figures of Deities and other Religious Drawings, as practised in Ladak, Zaskar, &c. —By Capt. H. H. Godwin Austen, F. R. G. S., ...	151
Note on a tank Section at Sealdah, Calcutta.—By H. F. Blanford, Esq., A. R. S. M., F. G. S..	154

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Page

Memorandum on the life-sized Statues lately exhumed inside the Palace of Delhi.—By C. Campbell, Esq., C. E., ... 159
Memoranda relative to three Andamanese in the charge of Major Tickell, when Deputy Commissioner of Amherst, Tenasserim in 1861.—By Lt.-Col. S. R. Tickell, ... 162
On the Ruins of Buddha Gayá.—By Bábu Ra'jendrala'la Mitra, ... 173
Description of a new species of Paradoxurus from the Andaman Islands.—By Lt.-Col. R. C. Tytler, ... 188
Extract from Journal of a Trip to Bhamo. By Dr. C. Williams, 189
Note on the Gibbon (Hylobates lar), of Tenasserim,—By Lt.-Col. S. R. Tickell, ... 196
Literary Intelligence, ... 199
Proceedings of the Asiatic Society for the months of March, April and May, 1864, ... 210
Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, for the months of January, February and March, 1864, ... i

---

No. 295.

(Published 13th September, 1864.)

Remarks on the date of the Pehewa Inscription of Raja Bhoja.—By Major-General A. Cunningham,... 223
Extract from a letter from Major-General Cunningham, dated Nynee Tál, 24th May, 1864, ... 229
Note on the Fossils in the Society's Collection reputed to be from Spiti.—By T. Oldham, Esq., F. R. S., &c. &c., ... 232
Notes on the variation of some Indian and Burmese Helicidæ, with an attempt at their re-arrangement, together with descriptions of new Burmese Gasteropoda.—By W. Theobald, Esq., Junior, ... 238
On Ancient Indian Weights.—By E. Thomas, Esq., ... 251
On the Language of the Sí-áh-pos'h Káfirs, with a short list of words; to which are added specimens of Kohistání, and other dialects spoken on the northern border of Afghanistán, &c.—By Captain H. G. Raverty, 3rd Regiment, Bombay N. I.,... 267
Some Persian Inscriptions found in Srinagar, Kashmir.—By the late Rev. I. Loewenthal,... 278
On the Vegetation of the Jhelum District of the Punjab.—By J. E. Tierney Aitchison, Esq., M. D., F. R. C. S., F. L. S., Assistant Surgeon, Bengal Army, &c., &c., ... 290
On a Land Grant of Mahendrapála Deva of Kanauj.—By Bábu Ra'jendrala'la Mitra, ... 321
Literary Intelligence, ... 332

Digitized by Google

Page

Proceedings of the Asiatic Society for the month of June, 1864, 335

Abstract of the Meteorological Observations taken at Gangaroowa, near Kandy, Ceylon, in July and August, 1863, ... i

---

No. 296.

(Published 19th December, 1864.)

On the application of the Characters of the Roman Alphabet to Oriental Languages.—By Capt. W. Nassau Lees, ... 345

On the Buddhist Remains of Sultánganj.—By Babu Ra'jendra-la'la Mitra, ... 360

Notes on the Didunculus Strigirostris, or Tooth-Billed Pigeon of the Navigator Islands—the nearest living Ally to the extinct Dodo.—Communicated By Sir W. Denison, ... 373

Memorandum on the Elephant Statues in the Delhi Palace.—By Col. J. Abbott, ... 375

Observations on the Geological features, &c., of the Country in the neighbourhood of Bunnoo and the Sanatorium of Shaikh Boodeen.—By C. P. Costello, Esq., Assistant Surgeon, 6th Punjab Infantry, ... 378

Extract from Report of the operations of the Great Trigonometrical Survey of India during the year 1862-63.—By Major J. T. Walker, R. E. Superintendent G. T. Survey, ... 381

On the Antiquities of Guzerat.—By Capt. H. Mackenzie, ... 402

Memorandum on the Question of British Trade with Western China viâ Burmah.—By Dr. C. Williams, ... 407

Table of the Coins of former Governments more or less current in the Bazars of the Goojrat District in 1859, ... 434

Literary Intelligence, ... 441

Proceedings of the Asiatic Society for the months of July, August and September, 1864, ... 442

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, for the months of April, May and June, 1864, ... xxv

Abstract of the Meteorological Observations taken at Gangaroowa, near Kandy, Ceylon, in September, October and November, 1863, ... xvii

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Supplementary No.

(Published December 23rd, 1864.)

Colonel Cunningham's Archæological Survey Report for 1863-64, communicated by the Government of India, ... i

Digitized by Google

Page

No. 297.

(Published 10th April, 1865)

On the Origin of the Hindví Language and its relation to the Urdu Dialect.—By Bábu Ra'jendrala'la Mitra. Corresponding Member of the German and the American Oriental Societies, ... 489
The Mines of Khetree in Rajpootana.—Ry Col. J. C. Brooke, 519
Note on the Hailstorm of Thursday the 24th March.—By Henry F. Blanford, A. R. S. M., F. G. S., Joint Secretary of the Asiatic Society, ... 530
Observations on keeping Salt-water Fish alive for a considerable time.—By Lt.-Col. R. C. Tytler, ... 534
Observations on a few species of Geckos alive in the possession of the Author.—By Lt.-Col. R. C. Tytler, ... 535
Inscription on the Muqbura at Hailan, ... 549
Peculiarities and Uses of the Pillar Towers of the British Islands, by Dr. T. A. Wise, ... 552
Proceedings of the Asiatic Society for the months of November and December, 1864, ... 573
Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, for the months of July, August, September, October, November and December, 1864, ... xlix
Abstract of the Meteorological Observations taken at Gangaroowa, near Kandy, Ceylon, in December 1863, and January and February, 1864, ... lxi
Appendix—List of Naturalists, Numismatists, &c., ... i

d by Google

LIST OF ILLUSTRATIONS, &c.

	Page
View on the Lake in Bassein, Plates, 1 and 2, ...	40
Sketch showing the Process of Fishery working in the Lake in Bassein, ...	41
Plan of the ruins at Barsoor, ...	44
Figure of Durga as Mahisamardini, ...	44
Inscription found in a temple at Barsoor, Pls. 1 and 2, ...	46
Outline for drawing Figs. of Deities, ...	151
Facsimile of a Sakya Thubba or Buddha, Pl. II., ...	152
Plan of Choortun from Zaskar, Ladakh, Pl. III., ...	152
Stone Figures, Dèkoo near Padum, Zaskar, Pl. IV., ...	152
Stone Figures, Dèkoo, near Padum, Zaskar, Pl. V., ...	154
Section at Sealdah, Calcutta, ...	155
Section at Kulnah, Jessore,...	158
Ground plan of the Ruins at Buddha Gayá, ...	173
Figure of a Nat at Tagoung, ...	192
Plan of Tagoung and Pugan, ...	194
Hylobates Lar, L., ...	196
Map of the Jhelum District, ...	290
Diagramatic Section of the Jhelum District, Plates I. and II.,	290
Facsimiles of the Benares and the Dighwa Plates, writing, ...	321
Copper Statue of Buddha at Sultánganj, ...	372
Didunculus Strigirostris, ...	374
Trade Routes to China viâ Burmah, ...	432
Trade Routes between Burmah and W. China, ...	432
Plates I. to IV. of Coins found in Guzerat, ...	440
Town of Khetree,...	519
Pounders of ore with 'Ghuns,'	522
Koomar making a Smelting Furnace,...	522
Copper Ore smelting furnace in play, ...	524
Copper Ore refining furnace, ...	525
Alum and Sulphate of copper works, Nos. 6 and 7.	526
Interior of boiling house for Alum and Sulphate of Copper, ...	528
Sections of Hailstones, Pls. I. and II., ...	530
Sketches of Pillar Towers, &c., 554, 556, 559, 561, 564,	565-8
Pillar Tower of Cashel,...	561
Doorway of Brechin Round Tower, ...	562

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JOURNAL

OF THE

ASIATIC SOCIETY.

No. I. 1864.

On the history of the Burmah Race.—By Lieut.-Colonel A. P. PHAYRE, C. B., *Chief Commissioner of British Burmah.*

The Chronicles of the Kings of Burma, called *Maha Radza Weng* are preserved with great care. Some years ago, the present writer was presented by the king of Burma with a complete copy of this national work. His Majesty is himself a man of learning, and the edition from which the information now presented is derived, appears to have been compiled under his direction with careful research. Supposed errors of former editions are pointed out, and original authorities are in such cases quoted. All that part of the history, which refers to cosmogony, and the dynasties of kings in India, is derived from Pali books, and has no more real connection with Burmese history, than the Hebrew annals have with British history. The object of the present paper is to make an epitome of the Burmese narrative, presenting only an outline of the main facts, yet omitting nothing which is necessary to be known to understand the history of the Burmese race as written by themselves.

The *Maha Radza Weng* commences with describing the self-development of the world, and the appearance of man therein. The system of cosmogony has, together with the Budhist philosophy and religion, been derived from India, and the Burmese kings profess to trace their descent from the Budhist kings of *Kappilawot* of the *Sakya* tribe, to which race *Gautama Budha* belonged. The history contains the Budhist account of the first formation of human society; the election of a king, and the grant to him of a share of the produce of the soil. These legends constitute to this day the foundation of the authority,

temporal and spiritual, of the Burmese kings. The foundation of that authority they continually refer to, and it is ever present to the minds of their subjects. It is proper therefore briefly to record that portion of the national history.

The history opens with announcing that after a cycle of the great revolutions of the universe, wherein worlds are destroyed by fire, by water, and by air, had elapsed, the present earth emerged from a deluge. A delicious substance like the ambrosia of the gods was left by the subsiding water, spread over the earth. The throne of Gautama first appeared above the water. At the same time, the beings called *Brahma*, who live in the upper world or heavenly regions, had accomplished their destinies. They then changed their state, and became beings with corporeal frames, but without sex.* Their bodies shone with their own light, and full of joy they soared like birds in the expanse of heaven. From eating of the ambrosia, the light of the bodies of these beings gradually declined, and because of the darkness, they became sore afraid. Because of the glory of those beings, and because also of the eternally established order of nature, the sun, of gold within and glass without, fifty *yoodzanas*† in diameter, and one hundred and fifty in circumference, appeared above the great Eastern island, (of the solar system,) and threw forth his light. The inhabitants of the world were then relieved from fear and called the sun (in Pali) *Thoo-ree-ya.*

In like manner the first appearance of the moon and stars is described, the central mount Myenmo (Meru,) and the whole sekya or solar system. The history then proceeds :—

"Of the world's first inhabitants, some were handsome, some not handsome. As the handsome ones despised the others, in consequence of the haughty evil thoughts thus engendered, the ambrosia of the earth disappeared, and they ate of the crust of the earth. Then in process of time selfishness and desire increasing, the earth's surface crust disappeared. They then ate of a sweet creeping plant; when that disappeared, the *Thalay* rice came up, which as they gathered, it was renewed morning and evening. Placing it in a stone jar, flames

* It is from these beings that the people called by Europeans *Burmas*, *Burmans* or *Burmese* take their name. In the Burmese language the name is written *Mran-má* or *Mram-ma* and is generally pronounced by themselves *Ba-má*. See note at the end.

† A modern *yoodzana* equals about thirteen English miles.

issued, and it was prepared for food. Its flavour was whatever the eater desired. From eating of this food, human passions were developed, and the beings became men and women. Then as evil deeds began to prevail, the wise censured and severely treated the others. The latter wishing to hide their evil deeds built houses. Then the lazy among them having stored up the food, the *Thalay* rice acquired husk, with a coating of coarse and fine bran, and where it once had appeared, it did not sprout again. They then said,—"It is good for us to divide among us the *Thalay* rice plants, to possess each his own." Then they distributed the *Thalay* rice plants. After that, an unprincipled one among them, fearing that his own share would not suffice, stole the share of another. Once and twice he was warned; in the third offence, he was beaten. From that time theft, falsehood and punishment existed."

The world's first inhabitants then assembled and thus consulted together: "Now wicked times have come; therefore let us select an upright religious man, one having the name and authority of a ruler, to reprove those who deserve reproof, and to expel those who deserve to be expelled, and let us give him a tenth share of our Thalay rice." This was agreed to, and an excellent man, full of glory and authority, the embryo of our *Gautama Phra*, being entreated to save them, was elected king, and was called *Mahá-tha-ma-dá*. In verse, it is sung that he was of pure nature, of exalted authority, and of the race of the sun.

"Like a second sun, he dispelled darkness or ignorance; his good qualities shone as the light, and from his power and authority, and from being the first of kings in acts of great diligence, he is called Manoo.* After this, men of wisdom who desired to destroy wickedness, lived in huts in the forest, and ate only what they received in charity; they were called *Brahmans*. Others tilled the ground and traded; they were called wealthy men and merchants. The rest being poor persons in humble employments were called *Soodras*, or poor people. Such were the four classes of men.†"

This history represents king *Maha-tha-ma-dá* as reigning for an

* The word appears to mean generally lawgiver or king. The word is Indian not Burman.

† Among the four classes, it will be observed that the ruling power is placed first according to the Budhist system. The *Brahmans* appear as literati and ascetics.

athen-khye, being a period represented by a unit and one hundred and forty cyphers. He had twenty-eight successors who reigned in the countries of *Malla* and *Kotha wattee*. The next dynasty which numbered fifty-six kings reigned in *Ayooz-za-poora*. The next of sixty kings reigned in *Bara-na-thee* or Benares. Then eighty-four thousand kings reigned in *Kap-pi-la* the native country of Gautama, in distant after times. Next thirty-six kings reigned in *Hat-li-poora*. Numerous other dynasties are mentioned which are represented as established in various countries of India, and as lasting for many millions of years.

The first king after *Maha-tha-ma-dá* whose history is brought in as directly connected with subsequent events, is *Auk-ká-kareet* king of *Bara-na-thee* or Benares. It is related that this king had five queens. The eldest named *Hat-ta* had four sons and five daughters. Having given birth to these children *Hat-ta* died. The king then married a young Princess who gave birth to a son named *Dzandoo*. The king highly pleased, promised to confer any favour on the young queen which she might ask. Prompted by her own kindred, she asked that her son might be declared heir to the throne. After much entreaty, the king consented, and calling his sons and daughters, gave them a retinue of followers, with elephants and horses, and they went forth to establish a country, and search for a place to build a city.

At this time the embryo of *Gautama Phra*, a wealthy *Kap-pi-la Brahman*, having abandoned his house, had become a hermit in a teak forest* in the Himalaya jungles or mountains. In the *Rad-za-Weng-gyee*, it is called an En-gyeen forest. There the hermit had built his lodge. The Princes came to the place in search of a site for a city. The hermit foresaw that a city built there, would, in after time, be of great fame in *Dzam-bu-dee-pa*, the world of man, and advised them to build their city there and to call it *Kap-pi-la-wot*.† Then the Princes consulted together saying "There are with us no king's daughters of our own race, nor are there any king's sons for our sisters; if marriages are made with other races the children become impure; in order to preserve our race, let us put aside our eldest sister as a mother,‡ and we four marry our four younger sisters." It was done so. From that

* The national chronicler discusses whether the forest in question consisted of Sal or of Teak trees. He finally decides in favour of the teak as the more dignified tree of the two, but appears to have come to a wrong conclusion.

† This appears to signify "the Kap-pi-la Brahman's place of religious duty.

‡ In Burma to this day the king's eldest daughter is not given in marriage, but remains unmarried at least during the life of her parents.

time the race became known as the *Tha-kya-tha-kee* race of *Kap-pi-la-wot.*

Regarding the origin of the *Kau-le-yá* Princes, the elder of these four brothers named *Auk-ka-mok-kha*, and the others, had put aside their elder sister *Pee-yá* as a mother. She was afflicted with leprosy, or a similar disease, and they determined to place her apart in a secluded spot They had her conveyed to a cave with a dwelling covered by branches of trees, and she was left there. At that time, in *Bara-na-thee*, there reigned *Ráma*, the son of *Brah-ma-dat.* He being afflicted with leprosy, gave over his kingdom to his eldest son, and went into the forest in search of herbs to cure himself. He established himself in a hollow tree, and before long, was by the use of herbs restored to health. Not far from this, was the place where the Princess *Pee-yá* was shut up. One day the Princess, being alarmed by a tiger, cried aloud, and king *Ráma* heard her. He came to the place, made himself known, and they were married. The Princess bore thirty-two sons, who were instructed by their father in all the accomplishments fit for Princes. When the king of *Bara-na-thee* heard what had happened, he offered to resign the kingdom to his father *Ráma.* But *Ráma* refused saying, "Here leaving my Ka-lan tree, I have built a city," and from that, the city came to be called *Kau-la-na-ga-rá* and thence *Kau-le-ya.* When the sons of king *Ráma* and queen *Pee-yá* had grown up, their mother said thus to them; "The Princes of the *Tha-kee* race of *Kap-pi-la-wot* are your uncles; their daughters are fond of dress and perfumes; when they come to bathe in the river *Rau-ha-nee,** you go to the river bank and seeing your comeliness they will love you." Their mother having said thus, the sons went to the river bank, and when the Tha-kee Princesses were drying their hair after bathing, they listened to the words of the Princes and followed them. When the Tha-kee Princes heard this, as the race of the young men was not different, they acquiesced. Thus commencing with king *Ráma* and queen *Pee-yá*, the *Kau-le-ya* tribe originated.

The *Dewá-da-há* kings began thus. The *Tha-kee* Princes of *Kap-pi-la-wot* had a small lake where they built a pleasure-house. When the country increased the place was called *Dewá-da-há.* The Prince who lived there was called the *Tha-kee* Prince of *Dewá-da-há.* So the

* This appears to be the Rohini, one of the feeders of the Rapti.

three kings of *Dewá-da-há*, *Kap-pi-la-wot* and *Kau-le-ya*, with numerous elephants, horses, and soldiers, carried white umbrellas, and attained to the dignity of kings of a great country.

From *Auk-ka-moo-kha* king of *Kap-pi-la-wot*, descended after many thousand years king *Dza-ya-the-na*. His son was *Thee-ha-ha-noo*, and the latter's son was *Thoo-dau-da-na*. The sister of *Thee-ha-ha-noo* was *Ya-thau-dha-ra*. The son and daughter of *Auk-ka-ka*, the king of *De-wá-da-ha*, were married to the daughter and son of king *Dza-ya-the-na* of *Kap-pi-la-wot*. The children of the *Dewá-da-ha* chief were *Inzana* the son, and *Kinzana* the daughter. *Thee-ha-ha-noo* the son of *Dza-ya-the-na* married *Kinzana*, and they had five sons named, *Thoo-dau-da-na*, *Dau-tau-da-na*, *Thek-kau-da-na*, *Thook-kau-da-na*, *A-mee-tau-da-na*; and two daughters, *Amee-tá* and *Pa-lee-tá*. *Dza-ya-the-ná's* daughter *Ya-thau-da-ya* married *In-za-na* the son of king of *De-wá-da-ha*, and had two sons, *Dan-da-ba-nee*, and *Thob-ba-bood-dha*; and two daughters *Thi-ri-ma-há-má-ya*, and *Pa-za-pa-tee-gaw-da-mee*. The elder daughter gave birth to the Phrá loung* Prince *Theiddatta*; the younger daughter gave birth to *Dza-na-pa-da-ka-lya-nee*, called also *Roo-pa-nan-da* and *Nanda*. *Ameeta* the daughter of *Thee-há-ha-noo*, married *Thob-ba-bood-dha* the son of *In-za-na*, and had a daughter *Bad-da-kin-za-ná*, and a son *De-wa-dat*.† The Prince or Phra loung *Theid-dat-ta-kooma-ra* the son of king *Thood-dau-da-na* married *Bad-dha-kin-za-ná* called also *Ya-thou-dha-ra*, the daughter of *Thob-ba-bood-dha* king of *De-wá-da-há*. They had one son *Ya-hoo-la*.

The (maternal) grandfather of the Phra, named king *In-za-na*, corrected the Calendar in the year 8645, and in 67 (of the new era) the Phra loung entered the womb of *Thi-ri-ma-há-má-ya*, and when ten months were completed he was born in the year 68, on the full of the moon *Ka-tshon*. At sixteen years of age, he married *Ya-thau-dha-ra* the daughter of *Thob-ba-bood-dha*, and for thirteen years enjoyed the life of a Prince in the palace. At twenty-nine years old, he went forth from the palace, and having attained Boodhahood, and preached

* Phrá loung *i. e.* the embryo Phrá, a term for Gautama Budha. The word *Phrá*, now adopted into the Burmese language, is according to Professor Wilson a corruption of the Sanscrit *Prabhu* Lord or Master. This appears to be the most probable origin of the word. It certainly is not a pure Burmese word. The orthography of it in ancient stone inscriptions at Pugân is Bu-rhá and Pú-rhá. The Burmese have used the original much as European nations have the Pali word Da-go-ba. The modern word is written *Phu-rá*.

† This *De-wa-dat* was the great opponent of *Budha Goutama*. They were first cousins by birth, and *Gautama* had married *Dewa-dat's sister*.

the law during fifty-one years, he, in the year 148,* at the age of eighty, passed to *Neib-ban*, or in common language, died. He died in the country of *Koo-thi-na-yoon*, where the *Malla* tribe ruled. In the month *Wagoung* of the same year, the first *Thenggá-ya-ná* or great council, was called by *A-dzá-ta-that* the king of *Radzagyo*, and it was then agreed, that that year should be counted as the year one, of religion.†

As the kings of Burma claim to be descended from the *Tha-kya* race of *Kap-pi-la-wot* to which Gautama belonged, the inter-marriages of the chiefs of that tribe are thus carefully detailed in the history.

Having brought down the narrative of events to the death of *Budha Gautama*, the first volume of the work proceeds to give an account of the geography of the world of *Dzam-boo-dee-pa*, where the Budhist kings reigned. In this mythological geography, *Dzam-boo-dee-pa* refers to the earth generally, but that term is constantly confused by being sometimes applied to the continent of India only, the other parts of the world being considered as too insignificant whether in extent or in civilization, to be mentioned. *Dzam-boo-dee-pa* therefore frequently represents India prominently, and the world remotely.

The great earth, or substratum of rock on which *Dzam-boo-dee-pa* rests, is represented as being 82,000 *yoozanas* in depth. On this rock, rests *Dzam-boo-dee-pa* or the island of the *Dzam-boo* or Eugenia tree. It is broad at the north side, and to the south narrows like the fore-part of a cart. This represents roughly the form of the continent of India, which shows that the ancient books followed by the history, frequently by the term *Dzam-boo-dee-pa*, referred to India only. From north to south it is ten thousand *yoozanas* long, and the same from east to west.

In the great ocean outside and which surrounds it, are five hundred small surrounding islands. Ceylon is a prominent island to the westward. At the northern extremity of *Dzam-boo-dee-pa*, grows the Eugenia tree with golden fruit, the size of globular water-pots.

In the Himalaya, it is stated there are seven great lakes. From one named *Anau-tat-ta* proceed four great aqueducts. By one of these, a river issues through the elephant mouth into the western sea; by another, a river falls through the horse-mouth to the northern sea;

* This refers to the era established by king *In-za-na*.

† According to the Burmese Calendar, the year 2406 of religion commenced on the 13th of April, 1862, when the year 1224 of the common era commenced.

one through the lion-mouth to the eastern sea; and one through the cow-mouth into the southern sea.

All the countries of India as mentioned in the *Maha Raza Weng* are enumerated below, but there appears to be some confusion, resulting apparently from some states having in the course of time subdued others, and from the historian not knowing, that some small States appear sometimes as members of a confederacy, in an extensive country occasionally called by one general name; and at other times are lost in the establishment of a monarchy.

The region of *Meets-tree-ma-detha* or the central land, is bounded to the east by *Ga-dzeng-ga-la-ne-gon* village; to the south-east by *Thal-la-wa-tee* river; to the south by *Thé-ta-kau-nee-ka-nee-gon* village; to the west by the Brahman village *Dho-na;* to the north by *Oothi-rid-da-dza* hill. In the centre is the great *Bau-di* tree. Around are the sixteen great countries which are as follows:—

1. En-ga.
2. Ma-ga-dá.
3. Ka-thee.
4. Kaw-tha-lá.
5. Wits-tsee.
6. Mál-lá.
7. Tsé-ti-ra.
8. Wan-tha.
9. Koo-roo.
10. Pin-tsa-la.
11. Mits-tsa.
12. Thoo-ra-the-na.
13. A-tha-ka.
14. A-wan-tee.
15. Gan-dá-ra.
16. Kam-bau-dza.

There are also 21 great countries:

1. Koo-roo.
2. Thek-ka.
3. Kau-tha-la.
4. Ma-ga-da.
5. Thee-wee.
6. Ka-lin-ga.
7. A-wan-tee.
8. Pin-tsa-la.
9. Wits-tsee.
10. Gan-dá-ra.
11. Tse-ti-ra.
12. Weng-ga.
13. Wee-dé-ha.
14. Kam-bau-dza.
15. Mad-da.
16. Beg-ga.
17. Eng-ga.
18. Thee-ha-la.
19. Kath-mi-ra.
20. Ka-thee.
21. Ban-da-wa.

The great kingdoms are twenty:

1. Ba-ra-na-thee.
2. Tha-wat-tee.
3. We-tha-li.
4. Mi-hti-la.

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5. Aa-la-wi.
6. Kau-tham-bee.
7. Oodz-dzé-nee.
8. Tek-ka-shyo-la.
9. Tsam-ba.
10. Tha-ga-la.
11. Than-thoo-ma-ra-gi-ri.
12. Ra-dza-gyo.
13. Kap-pi-la-wot.
14. Tha-ké-ta.
15. In-da-pa-ta-na-go.
16. Ook-ka-ta.
17. Pa-ta-li-poot.
18. Dze-loot-ta-ra.
19. Theng-kath-tha-na-go.
20. Koo-thee-na-yon.

Such were the countries in the time of Gautama.

The countries reigned over by all the great kings commencing from *Maha-tha-ma-dá*, and numbering three hundred and thirty-four thousand five hundred and sixty-nine kings were :

1. Ko-tha-wa-tee.
2. Ra-dza-gyo.
3. Mi-hti-la.
4. Bá-ra-na-thee.
5. Kappi-la.
6. Hat-ti-poo-ra.
7. E-ka-tsek-khoo.
8. Wa-tsee-ra-wot-tee.
9. Ma-dhoo-ra.
10. Aree-ta-poo-ra.
11. In-da-pa-ta-na-go.
12. Kau-Thamb-bee.
13. Kan-na-gantz-tsha.
14. Raw-tsa-na.
15. Tsam-ba.
16. Tek-ka-so.
17. Ko-thi-na-yon.
18. Ma-lit-ti-ya.
19. Kap-pi-la-wot.
20. Kau-li-ya.
21. De-wa-da-há.

The first volume of the history then concludes with maxims for kings and people which need not be entered here.

The second volume opens with the following words :

" In the first part we have narrated the history of the kings commencing from *Mahá Thama-dá* up to the time of the excellent *Phra Gautama*, there being three hundred and thirty-four thousand five hundred and sixty-nine kings in lineal succession. In this second portion we shall relate the history of thirty kings commencing from *Peim-ba-tha-ra* up to king *Dham-ma-thau-ka*."

Of these princes it will not be necessary to relate more than what is essential in order to understand the history of Burmah. The history first refers to the country of *Ra-dza-gyo* and then follows the stream of Budhist religion and authority, until it widens into the broad chanel of sovereignty under *Dham-ma-thau-ka*, whose seat of empire was at *Pa-ti-li-poot*.

Thoodhau-dha-na, king of the Thek-ka state in the country of *Kap-pi-la-wot*, had a great friendship for *Bha-gee-nee-ya* king of *Ra-dza-gyo* in *Magadha*. The prince *Theid-dhat-ta* had also a great friendship for the prince of *Ra-dza-gyo*, *Beem-ba-thá-ya*. The latter died eight years before Gautama attained *neibban*, and his son *A-dzá-ta-that* succeeded. *A-dzá-ta-that* reigned thirty-two years until the year 24 of religion [B. C. 519,] when he was succeeded by his son *Oo-da-ya-bad-da*.

A-dza-ta-that formed a friendship with that base man *De-wa-dat*, and having murdered his father was condemned to hell; but after a long term of suffering he was to be permitted to be born as a *Pits-tsi-ka-Budha*. He was succeeded by his son *Oo-da-ya-bad-da* who reigned until the year 40 of religion, when his son *A-noo-rood-da* conspired and reigned in his stead.

In the year 72 of religion his descendant *Na-ga-da-tha* was set aside by the people as one of a parricide race, and a nobleman named *Thoo-thoo-na-ga* succeeded him. His history is as follows. In the country of *We-tha-li** the *Leitz-tsha-wee* princes assembled and consulted thus—"Our country has all the elements of greatness, yet is quiet when exertion is called for. Why are other countries constantly stirred up?" They decided that the country was quiet because there were no courtezans. They therefore caused the daughter of a wealthy man, one of their own race, to be so appointed. One of the *Leitz-tsha-wee* princes took her to his own house. She gave birth to a son. The child was put into a jar and thrown outside the city. The jar was found by some of the citizens, opened, and the child was taken and brought up by a noble. He was named *Thoo-thoo-na-ga* because the city Naga had uttered a sound like *thoo-thoo* which led to the discovery of the jar.

At a time when king *A-dza-ta-that* meditated an attack against *We-tha-li*, he sent the Brahman *Wa-tha-ka-ya* to *Gautama*, who replied that the *We-tha-li* princes observed the law and were destined to long greatness. The king said to the Brahman, "What shall we do?" The Brahman replied, "Make a show of banishing me from the country; I will first go and destroy the unanimity of the *We-tha-li* princes, and you can then march and conquer the country." In three

* *We-tha-li* appears to have been one of the States of the *Leitz-tsha-wee* princes?

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years the plan was accomplished, and by this means, the child *Thoo-thoo-na-ga*, who had become a noble, was brought to *Ra-dza-gyo* and eventually became king.

King *Thoo-thoo-na-ga* lived in *We-tha-li*. After a reign of eighteen years, he died in the year of religion 90.

He was succeeded by his son *Ka-la-thau-ka*. In his reign in the year of religion 100, the second great Council was held in *We-tha-li* under Shen-ya-tha-tay with seven hundred Rahandas. He died in the year of religion 118. On his death his son *Bad-da-thé-na*, with nine younger brothers, reigned for twenty-two years. In the year 140, the last of these ten brothers named *Pin-za-ma-ka*, was king. He was killed by one *Kho-mhoo-nan-da* who became king with the name of *Oog-ga-the-na*. His history was as follows:—On the border of the country of *We-tha-li*, there lived a robber chief, who at the head of a large band plundered the country. Once, in plundering a party of merchants, a porter belonging to them joined the robbers. He in time became the captain of the band and was called *Kho-thoo-nan-da*. Gradually he acquired power, and at length usurped the throne, putting to death the king *Pin-za-ma-ka*.

Oog-ga-thé-na did not live long. His eight younger brothers succeeded him. The last of them was *Da-na-nan-da-meng*. He was murdered by *Dza-nek-ka* the Brahman, and prince *Tsan-da-got-ta* of the *Mau-re-ya* line was placed on the throne. He was king of all *Dzambu-dee-pa*.

The history of *Mau-re-ya* is thus: In the time of the Phra, some of the Tha-kee princes went and built a city in the Himalaya forests. It was called *Mau-re-ya* from peacocks being numerous there, or from the city being in the shape of a peacock's neck. *Dza-nek-ka*, the Brahman, was an inhabitant of the country of *Tek-ka-tho*. His father died early and he was brought up under the care of his mother. He when young was noted for his learning and accomplishments. It was predicted that he would become a king, but at the request of his mother he broke his canine teeth and vowed never to become a king. He came to the country of *Pa-ti-li-poot*, in the reign of *Da-na-nan-da*. He became acquainted with the king's son, *Pap-pa-ta*, and persuaded him to leave the city and live in the forest. He endeavoured to find a person to substitute for prince *Pap-pa-ta* as successor to the throne and he found *Tsan-da-got-ta*. His history is thus related. Once the

country of *Mau-re-ya* was attacked and subdued. The queen being pregnant fled to the country of *Pa-ti-li-poot*, and there gave birth to a son. The child was put in an earthen vessel and placed near a cow enclosure. The cowherd found him and brought him up with his own children. A friend of the cowherd, a hunter, loved the child and asked for him. The child then was made over to the hunter. He displayed great power and ability, and the Brahman *Dza-nek-ka* hearing thereof gained possession of him from the hunter. The Brahman brought him up until he was full grown. He was named *Tsan-da-got-ta*. By an artifice *Tsan-da-got-ta* was induced to murder prince *Pap-pa-ta*. *Tsan-da-got-ta* then under the influence of *Dza-nek-ka* gradually collected forces, attacked villages, and at last expelled king *Da-na-nan-da* from *Pa-ti-li-poot*.

Tsan-da-got-ta then was consecrated king. He had a son born to him who was named *Bein-du-tha-ya*. *Tsan-da-got-ta* died after a reign of 24 years in the year of religion 186 = B. C. 357.

His son *Bein-doo-tha-ya* married a princess of the *Mau-re-ya* race, who gave birth to *Dham-ma-thau-ka*. This Prince appears to have murdered all his father's sons by other mothers than his own. *Bein-doo-tha-ya* either died naturally or was murdered in 214 of religion.

Dham-ma-thau-ka attended to the internal affairs of the country for four years before he was crowned, and in the year 218* of religion he received the *abeit theit*. His brother *Tei-tha* he appointed Crown Prince Four years after being consecrated as king, he sincerely entered religion. The history of *Dham-ma-thau-ka* as the great supporter of Budhism, the founder and encourager of missions, is narrated at considerable length. He discovered and opened the under-ground building in which the relics of Gautama had been deposited by *A-dza-ta-that ;* he took them out and distributed them. In the year 234† of religion, he assembled the third general council presided over by *Mang-ga-lee-poot-ta-tee-tha-tay* and consisting of one thousand selected Rahans. He then turned his attention to the great object of establishing religion all over the world or in all countries contiguous to

* B. C. 325. On this subject see Cunningham's Bhilsa topes, page 74. He applies a correction of sixty-six years to this Buddhistical date, and gives good reason for doing so.

† B. C. 309. This is not the date of the third general council as given in Cunningham's Bhilsa topes, page 116, and to which the correction must be applied.

India. For the present history, it is only necessary to notice two out of the nine missionaries then sent forth. They are *Yau-na-ka-dham-ma-rek-khee-ta* to *A-pa-ran-ta* or Burma according to this history; and *Oot-ta-rá* and *Thau-na* to *Thoo-wan-na Bhoom-mee* or the Talaing country. In both those countries the missions were successful, and multitudes of men and women became Rahans. King *Dham-ma-thau-ka* died in the year 255 of religion.

The second volume of the history ends with the death of this king.

The third volume of the *Maha Radza-weng* commences with the direct history of the Burmese kings in the following words: "We shall now relate the first commencement of the long line of the *Mran-má* kings in the great country of Tagoung; the origin of all the kings who have reigned in the land; and also treat of the first foundation and the progress of divine religion in the *Mran-má* country, under the *Mran-má* kings."

The country which in the time of our lord Gautama is called *Ta-goung*, was originally established by Abhi Radza. His history is as follows. Before the appearance of the lord Gautama, the king of *Kau-tha-la* and *Pin-za-la-reet*, wishing to ally himself with the king of *Kau-lee-ya*, sent a noble to demand one of the daughters of that sovereign. The *Kau-lee-ya* king from pride of race did not send a satisfactory answer. A war then arose, and the king of *Pin-za-la-reet* was victorious. The three *Tha-kee* kings of *Kau-lee-ya*, *De-wa-da-ha*, and *Kap-pi-la-wot* being conquered, their countries were destroyed. Afterwards they were once more restored to prosperity. At the time when the *Tha-kee* kings were thus depressed, *Abhi Radza* the king of *Tha-kya Tha-kee* race in *Kap-pi-la-wot*, in consequence of the disturbed state of *Mitz-tzi-ma-de-tha*, took with him his army, and went and established the country called *Then-ga-tha-ra-ta* or *Tagoung*.* *Abhi Radza* at his death left two sons, the elder named *Kan Radza gyee*, and the younger *Kan Radza ngay*. They quarrelled regarding their succession to the throne. By the advice of the wise men of the nation, they agreed to abide by the result of a rivalry in good works, and not of war. It was arranged that each was to commence at night fall to erect an *alhoo mandât* or religious building, and the Prince who first finished his building was to succeed to the place of the father.

* Tagoung is an ancient city now in ruins situated on the Irrawaddy river in about 23° 30′ N. L.

Each selected a hill on which to erect a building. The elder brother commenced his building with heavy timbers and bamboos. The younger brother commenced with light timbers and covered it with white cloth and plaster, so it was finished in one night. In the morning when the elder brother saw that he had lost, he collected his followers and went down the Irrawaddy river. He then ascended the *Tha-la-watee* or *Khyen-dween* river, and established himself at *Ka-lé doung.** At that time the tribes called *Pyoo kam yan* and *Thek* asked for a king, and the Prince made his son *Moo-doo-tseit-ta* king over the *Pyoo* tribe. "*Kan Radza gyee* went westward and established himself on the mountain called *Kyouk pan toung*† east of the river *Gits-tsha-bá.* He then became king of the country."

Kan Radza ngay reigned in Tagoung the country of his father. He had thirty-one descendants who reigned successively in Tagoung. In the time of *Bhein-na-ká* the last king of that race, Chinese and Tartars from *Gan-da-la-reet* Province, in the country of *Tsein*, invaded the kingdom. The king was obliged to retire with his army to the *Ma-lé khyoung*‡ where he died. From thence his force was divided into three parts; one went eastward and established the nineteen Shan states; another division went down the Irrawaddy river and remained in the country of the *Pyoo-kan-ran* and *Thek* tribes, where the *Tha-kee* Prince *Moo-doo-Tseit-ta* had formerly established himself in *Thoo-na-pa-ran-ta.* A portion remained in *Malé* with the chief Queen *Na-ga-tshein.*

At this time Gautama appeared in *Mitz-tsee-ma-detha.* The king of *Tha-wat-tee, Pa-the-na-dee, Kau-tha-la,* demanded a daughter in marriage from *Mahá-ná-ma*§ king of *Kap-pi-la-wot.* The king did not give him a pure daughter, but one born from a slave girl and named *Wa-tha-bha-Khat-ti-ya.* She gave birth to a son named *Wee-ta-thoo-pa.* When he had grown up, he went to see his relations in *Kap-pi-la-wot.* As they insulted him on account of his inferior birth he determined on revenge. After his father's death he thrice led his armies against *Kap-pi-la-wot* but was restrained by the expostulations

* This lies west of the Khyeng-dwen in about 23° N. L.

† This is a mountain in the northern part of Arakan. The story here related is found also in the history of Arakan. Vide Journal Asiatic Society, Vol. XIII. p. 34.

‡ Malé is on the Irrawaddy river, about eighty miles above Amerapoora.

§ It is presumed that after the death of Thoo-dau-daná the father of Budha Gautama, Mahá-ná-ma one of the same family succeeded to the throne.

of the lord Gautama. A fourth time Gautama seeing inevitable punishment due to the demerit of the Sakee Princes forbade him not. The Tha-kee race of *Kap-pi-la-wot* of which *Mahá-ná-ma* was then king was either destroyed, or dispersed among the neighbouring states of *Maure-ya* and *We-dee-tha gi-ra-dza*. Thus was that great country of *Kap-pi-la-wot* twice destroyed; once in the time of king *Kau-le-ya*, and once in the time of king *Mahá-ná-ma*.

At the time of this last destruction, one of the *Tha-kee* Princes named *Daza Radza* left *Mits-tshee-ma-de-tha* with many followers, and first established himself at *Mau-re-ya*,* called also *Mau-ringa*, and now *Mwé-yeng*. From thence he removed and established himself in the country of *Theng-dwai*. From thence he removed to *Malé* where he met the Queen *Na-ga-tshein*, and as they were of the same *Tha-kee-ya* race they were married. They then built the city of upper Pugàn. There a son named *Wee-ra-ga* was born to them. They once more removed to the ancient capital of the *Tha-kee* race of kings called Ta-goung or *Theng-ga-tha-ra-ta* and called it *Pin-tsa-la-reet*, and hence the country is also called *Pin-tsa-ta-goung*. This king established regular government. By his two chief Queens he had twenty sons and twenty daughters, and the sons married their half sisters.

To this king there succeeded seventeen kings in regular succession, but their reigns were very short. The last of them was named *Tha-do-má-há-radza*. This king had no son. The chief Queen *Kein na-ree De-wee* had a brother named *La-bá-doo-há* and he was appointed *Ein-Shé-men* or Crown Prince.

At that time in the country of the *Pyoo* tribe the race of kings descended from *Moo-doo-tseit-ta* the son of *Kan Radza gyee*, as above related, was represented by *Tap-boo-la*. He was disturbed by attacks from *Dhi-ngya-wa-tee* or Arakan, and went with his people to the *Tha-gya* lake.

"As then we have related the first dawning of the Burmese country of *Ta-goung* before the lord Gautama appeared, now we shall proceed to narrate the history of *Tha-re-khet-ta-ya*.†"

* By this name is meant the country west of the Khyeng-dweng river now called the Kubo valley.

† This is the name of the ancient city to the east of Prome. It appears to refer to the Khatri or Rajpoot caste.

"In the fifth year after the lord Gautama attained to the state of Budha, two brothers named *Maha-poon* and *Tsoo-la-poon* asking leave from the Phra, built a monastery called *Tsan-da-koo-nan-tha* at the village of Say-gaing in the country of *Thoo-na-pa-ran-ta*.* The Phra also prophesied (that) 'hereafter in the *Mran-má* country my religion will be long established,' and accompanied by five hundred Rahandas he frequently came through the air before the monastery was finished; when the monastery was finished he received it in gift, and remained there seven days, and preached. At that time five hundred men and five hundred women in *Thoo-na-pa-ran-ta* became Rahandas. At that place was a hermit named *Theet-tsa-ban-da* who had attained the state of an Areeya. At his intercession the Phra left the impression of one foot on the *Theet-tsa-pan* hill; and at the intercession of the *Na-man-da Na-ga* he left the impression of the other on the bank of the Mán stream. Thus two firmly founded pagodas were fixed in the rock as if sealed down, and the Lord said:— 'Hereafter my religion shall be long established in the countries of *Thoo-na-pa-ran-ta* and *Tampa-dena*.'† From thence the *Phra* went and arrived at the Pho-eoo hill.‡ To the south-east was the sea. On the water was the appearance of something floating and just appearing above the surface. A little *pwé* or bamboo rat lifted up its nose and did homage to the omniscient *Phra*. The *Phra* smiled at these two omens, and, in reply to his younger brother who asked for explanation, said, 'Beloved Anan-da, in the year 101, after I shall have entered into the rest of *pa-ree-neib-ban*, five great omens shall be manifested here. They are, *first*, A violent earthquake shall shake the whole land. *Second*, where the Bho-oo peak now rises there shall be a lake. *Third*, the *Tsa-moon-than-my-eit* river shall be formed. *Fourth*, the earth

* This is on the Mán river which runs into the Irrawaddy from the westward near the town of Menboo.

† Tampa-dena is one of the ancient names for Ceylon. According to the practice of the Budhist nations of Indo-Chinese to transfer to their own countries the name of Budhist lands in the west, this name was given to Pugân and the surrounding country. The name was probably given after the books were brought from them and a reformation made in religion. Pugân was more anciently called *A-rimad-da-na*. This history, however, intimates that *Tampa-dee-pa* was the more ancient name. *Thoo-na-pa-ran-ta* is mentioned as a country in the Budhist Scriptures. See *Hardy's Budhism*, p. 259.

‡ This is the name of a peak on the west bank of the Irrawaddy near to Prome. Great changes no doubt have occurred in the course of the Irrawaddy river, probably within the historical period, about Prome. The rocks around Prome contain large deposits of marine shells, so that the Burmese had evidence of the sea having once reached there.

shall rise and form *Poop-pa-toung.** *Fifth*, in the country to become *Tha-re-khet-te-ya*, the sea shall be dried up. In the time when those omens shall be manifested and fulfilled, that little *pwé*, removed from his existing body, and become a man, shall be king over a great country under the name of *Dwot-ta-boung*. In that king's reign, in the *Mraa-má* country, my divine religion shall flourish and shall exist throughout long ages-' "

According to that divine prediction the Phra went to *yaree-neibban* and in the year 40 of religion in the reign of *Tha-do-ma-ha Radza* king of *Pin-tsa-ta-goung* before mentioned, a mighty boar twelve cubits high ravaged the country. The Crown prince *La-ba-doo-ha* went forth armed to destroy him. The boar fled to the Shan country, and the prince followed. The glen where he entered the mountains east of the Irrawaddy is called *Wet-weng* (boar entrance) to this day. The prince chased him down the west bank of the Irrawaddy, though how the boar arrived there is not stated, and he crossed again to the east bank. As from his great height his belly was not wet by the water, the place he reached is still called *Wet-ma-towot*† (boar not wet). The boar then continued his flight down the east bank of the river until he came to an island near to *Tha-re-khet-ta-ya*. There the prince overtook him. The place is called *Wet-hto-kwyen* to this day.

The prince now reflected that he was far from the country of Ta-goung, and that his story of having killed the boar would not be believed; and wearied with the world he determined to become a hermit in the place where he was. There were then no inhabitants near at hand except wild animals. In the jungle a doe produced a young one in the form of a human female child. The doe, startled by the cry of the infant, fled, and the hermit coming to the spot was astonished at the sight. The hermit carried the child to his cell, and brought her up as his own daughter. When she was grown up, he gave her the name of *Bhe-da-ree*. " Such is the story of the first establishment of the city of *Tha-ré-khet-ta-ya* by the hermit who was the brother-in-law of the king of Ta-goung."

In the very year when the Crown-prince *La-ba-doo-há* went forth to slay the boar, the queen of Ta-goung gave birth to twin sons. They

* The name of an extinct volcano about 200 miles north from Prome.

† This is a place below the petroleum wells in the Irrawaddy river.

were both born blind and named *Mahá-Tham-ba-wá* and *Tsoo-la-tham-ba-wá.* The king from shame ordered them to be killed; but the queen loving the children of her own bosom concealed them, until they were nineteen years of age. The king then having discovered that they were alive, again ordered them to be killed; but the queen had them put into a boat, with many days' provisions, and set them afloat on the Irrawaddy river. As they floated down the river, the boat struck against the branch of a *Tseet* tree. At that spot in after times was built the city of *Tseet Kaing.* As they proceeded down they met with a *Bee-loo-ma,* who gave them some medicine to restore their eye-sight. The cure was effected, and looking up and seeing the sky for the first time they said, "The sky is as a cover; the earth is underneath," and hence the place they were passing was called *Myé-daí.* At length they reached the place at Prome* where their uncle the hermit dwelt. There they beheld the hermit's daughter *Bhe-da-ree* drawing water from the stream, with a gourd. As the water would not flow readily into the gourd they opened it. *Bhe-da-ree* then filled it and returned to her father's cell. She told him the cause of her quick return, and the young Princes being called, they told their story, and the hermit learned then, that they were the sons of his sister the Queen *Kein-naree-de-wee.* After this the elder brother Prince *Mahá-Tham-ba-wá* was married to the hermit's daughter *Bhe-da-ree.* This was in the year 60 of religion according to the *Mahá Radza Weng,* or, by the Burmese reckoning of the period of Gautama's death, 483 years before Christ. From this time commences the history of the monarchy established at *Thare-khet-ta-ya,* and no further notice is taken of Tagoung and the upper country of the Irrawaddy until some centuries later.

Note on the etymology of the word Myan-ma or Mran-má.

In the Journal of the Asiatic Society No. I. of 1853, is an interesting paper by Mr. B. H. Hodgson, on the languages of the Indo-Chinese borderers, compared with the Thibetan and Himálayan tongues. In that paper Mr. Hodgson appears to conclude that the term Burma or Burmese, which is the Europeanized form of the name by which

* See Journal of the Asiatic Society, Vol. XXV. p. 173, for an account of the pagoda built upon that spot.

that people call themselves, can be traced to the native name for man. This, however, is open to some doubt; but Mr. Hodgson's general conclusion that the languages of the Himálayan, Indo-Chinese, and Thibetan tribes are of one family is fully justified.

The name by which the people known to Europeans as Burmans or Burmese call themselves, is written by them Mran-ma and sometimes Mram-ma, and is pronounced Ba-má. The Arakanese call themselves Ma-ra-má which is a variation of the same word. The questions involved are,—

1st. Does the word Mran-ma contain the root signifying man in some of the Indo-Chinese dialects?

2nd. Is the word Mran-ma directly derived from the name for man generally, and on that account used as the national designation of the Burma?

3rd. Can any other origin for the term Mran-ma be found, from which it is more likely to be derived?

It is shown by Mr. Hodgson that in many of the above languages *ma* and *mi* mean *I*, and *man*, (pp. 5, 34, 36 and 63), and hence it is concluded that the etymology of *Burma* or Burmese is recovered. The word Burma or Burmese no doubt is the European form of Bamá. Is the written form *Mran-ma* the original, of which the spoken form *Ba-má* is a mere colloquialism? or is the latter the real original expression of the name for the race? The Arakanese, it may be noted, do not use the form *Ba-má* and therefore are never called by Europeans Burmans or Burmese.

The root *mi* in the Burmese language has now no known reference to the pronoun *I*, or to *man*, as a general term, whatever it may formerly have had. It now means female; with the prefix *a* it means mother, and sometimes a daughter. As an affix to the word *tha* or *Sa*, *child*, it signifies a female *child*. The root *ma* has the same general meaning, *female*; but has a more dignified signification than *mi*. It is also applied to female animals. The word for woman, *Mien-ma* or *Mi-ma*, is probably the union of the two forms of the root representing female, and is applied to woman as the female *par excellence* (see p. 66 of Mr. Hodgson's paper). The personal pronoun *Nga=I*, is both masculine and feminine. But though I cannot agree that the root *mi* or *ma* appears in the word *Mran-má*, that root may possibly appear in the Burmese word *myo*, *mro* or in its Arakanese

form, *mru=race*, and *seed;* possibly also this word may originally have signified *man*, in the Burmese as now in the Mrú language, (see p. 34). Mr. J. R. Logan in the Journal of the Ind. Arch. for 1857, Vol. II., observes "The root of Mran-má is *ran*, one of the forms of a widely spread Himalaic name for man. Karen has the same root, with the guttural in place of the lateral prefix." I have not been able to satisfy myself as to the grounds on which this observation is founded.

The question still remains, whence the word *Mran-má*, which is pronounced *Ba-má*, and in the Arakanese form Ma-ra-má, is derived?

I believe it to be a modern appellation adopted by the people since they became Budhist, and derived from the Pali word Brah-ma signifying celestial beings, as shown in the text. Hence it really has only an accidental similarity to the word for man in some of the Indo-Chinese dialects. It is much as if the *Angli* had adopted the national name *Angeli* with their Christianity, with this difference, that we know for certain that the *Angli* originally so called themselves, but we do not know for certain what the Burmese called themselves, before they adopted the name *Mran-má*. The pride of the people caused them to assume this as their national designation. The only names for the ancient tribes which may have become the *Mran-ma* nation, which we are acquainted with, are *Pyoo*, *Kan-yan* or *Kan-ran* and *Thek* or *Sak*.

Is it possible that in adopting the word Brah-ma as their national name they kept in view also their native root *ma* as Mr. Hodgson would appear to conclude? This I will not venture to affirm, but of the direct origin of the present national name I have no doubt. Nor need it cause surprise that a people should have adopted a foreign term to designate themselves. With their religious instructors they received knowledge of every kind. The districts of their country were named after the countries of their teachers. Even their great river, known in the vernacular as *Myit-gyi*, received an equivalent term in Pali,—*E-ra-wa-ti*; and their capital city always has a Pali name. From the history it is evident that the name Mran-má was not adopted until after several tribes had been united under one powerful chief, by whose fiat the name would readily have been adopted.

With reference, however, to the root *mi* and its appearance in the word *Mien-ma* or *Mim-ma* (woman), it is curious that the Chinese of Yunan call the Burmese *Mien* or *loung-mien*, and that is the name

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given to them by Marco Polo. I cannot say how the Chinese got the word, but it is possible that *Mien* was the original name for the race, and contains the root meaning man. However that may be, the word in this or any similar sense is now entirely lost among the Burmese, excepting as above noted in the term for woman, and it may be in *Mru* (race). It does not appear as the name of any of the tribes with which the Burmese might be supposed to be immediately connected.

Observations.

Having traced thus far the legends of the Burmese race from the earliest period, down to the time when a new dynasty was established near Prome, about three hundred miles lower down the Irrawaddy than the ancient capital Tagoung, it will be convenient to pause, and enquire how far we can discern any true historical basis in the legends and tales which have been narrated.

The physiognomy and the language of the Burmese people, as well as those of the adjoining tribes, proclaim them all to belong to the same family of nations as the tribes of Thibet and the Eastern Himalaya. Whence did they come? and how did they arrive at their present country? The theory of Prichard in his Natural History of Man on this subject is probable, is supported by existing facts, and accords with the physical geography of the regions north of the countries now occupied by the Indo-Chinese races. That author thus refers to those peoples. "The vast region of Asia forming the south-eastern corner of that Continent, which reaches in the sea border from the common mouth of the Ganges and the Brahmaputra, to the Hoang-ho, or Yellow River of China, and even further northward towards the mouth of the Amur or Selinga, is inhabited by races of people who resemble each other so strongly in moral and physical peculiarities, and in the general character of their languages, as to give rise to a suspicion that they all belong to one stock. With the rivers which descend from the high country of Central Asia, and pour their diverging waters on all sides, after traversing extensive regions of lower elevation, into the remote ocean, these nations appear also to have come down, at various periods, from the south-eastern border of the Great Plateau; in different parts of which, tribes are still recognised who resemble them in features and language."

To the great central region of high Asia, Prichard traces what he terms the five nomadic races, namely the Ugrian, the Turkish, the Mongolian, the Tungusian, and on the south-east the Bhotiya, "the mountain people who on the northern boundary of Hindustan have appropriated the name of Tartars, though they have no right to that celebrated appellation, which belonged originally to the Mongolian tribe who inhabited the banks of the lake Bougir." And again, "If we were at liberty to hazard a conjecture as to the origin of their nation, it would be, that all the people who inhabit the low countries of south-eastern Asia, from the mouth of the Amur, or at least from that of the Hoang-ho, southward and westward as far as the Brahmaputra, are offsets from one of the great nomadic races of high Asia, namely from the Bhotiya, who occupy the southern margin of the great central upland." This conjecture is in a great measure confirmed by the researches of Mr. B. H. Hodgson, who, in the paper already quoted, observes that "One type of language prevails from the Kali to the Kuladan, and from Ladakh to Malacca, so as to bring the Himalayans, the Indo-Chinese, and Thibetans into one family."

It is reasonable to conclude that tribes leaving the south-eastern margin of the great plateau of central Asia, early in the existence of the human race, would naturally follow the downward course of streams and rivers. Among the earlier emigrants from that part of Asia towards the south, as far as we can now discover, were the ancestors of the present *Mon* or *Talaing* people, the aborigines, so to speak, of Pegu. It is also probable that the Karens left their ancient dwelling-place at an early period. They have remained for the most part up to the present time uninfluenced by Budhism, and with their language unwritten, until about the year 1830 A. D. Their traditions of their own origin, or at least of the route by which they arrived at their present seats, are therefore more trustworthy than those of the Burmese or of the Talaings are, regarding themselves. Many of these traditions are preserved in a small volume written by the Rev. Dr. Mason, Missionary to the Karen people. It is entitled "Traditions of the Elders." While the traditions or legends of the Burmese, influenced by the source whence they derived their religion, and by the ambition of their kings to trace descent from the Budhist sovereigns of their holy land, refer to India as the cradle of the royal race, and almost seem to derive the great body of the people from

the same country, the more trustworthy traditions of the Karens point to central Asia as their ancient home.

Their traditions say, "We anciently came from beyond the river of running sand, and having marked out Zimmay (two hundred and fifty miles north-east of Maulmain), for ourselves, returned. Afterwards when we came to dwell there, we found the Shans occupying the country. Then the Karens cursed them, saying, 'Dwell ye in the dividing of countries.'"

The countries in which Europeans first came in contact with Karens have only lately been occupied by them, but the mountain country between the Salween and Sitang rivers, has probably been theirs for many ages.

Dr. Mason points out that Fa-Hian, the Chinese pilgrim to India of the fourth century, also speaks of crossing the "river of sand" or great desert between China and Thibet. Further it is stated, "Their traditions point unequivocally to an ancient connection with China; for Tie or Tien is spoken of as a god inferior to Jehovah,* and offering to the manes of their ancestors is as common among the Karens as it is among the Chinese." It is evident "the river of sand" of the Karens must be the great sandy desert of Mongolia, stretching for many hundreds of miles along either side of the 40° of North latitude. The story of coming to Zimmay under a chief to inspect the country, and then returning, must be accepted as the modern version of the fact, that about Zimmay they were stopped in their progress south along the water-shed range, between the Salween and Menam rivers, by the previous occupation of the Shan race. The Karens are mentioned by Marco Polo, and appear then to have occupied the country east of Bamo on the upper Irrawaddy.

Some of the religious traditions of the Karens are remarkable. They are distinguished from all the Indo-Chinese tribes with which I am acquainted, by the knowledge they have of the existence of one eternal God. He is not worshipped, because, as they appear to suppose, he is angry with them. It is impossible to conjecture with probability how they acquired this knowledge. They believe also that they once possessed books. Notwithstanding what has been said by some writers as to the "Caucasian countenances," the long faces, and "straight noses" of the Karens, I must uphold that their national

* Or Yu-wa, the name given by the Karens to God.

physiognomy is essentially Indo-Chinese, and their speech connects them with the same family. In every Indo-Chinese tribe, occasional exceptions to the general flat physiognomy are met with. These are almost always among the men. The women have more frequently the true type of Mongolian or Bhotiya face.

Such tribes as the Burmese, the Karens and the Mon would readily find their way from central Asia by the courses of the rivers Salween and Mee-nam towards the south. Some would be led westerly, and so gain the valley of the Irrawaddy in the upper course of that river. This, the Talaings and Burmese probably did at an early period,* while the Karens kept for ages to the mountains bordering east and west of the Salween and Mee-nam rivers, and only lately came into the Irrawaddy valley and along the mountains bordering the sea-coast as far as the 12° N. L. They may be classed in three great divisions, having numerous tribes and dialects, but all possessing the same characteristics as far as they have been observed, up to the 20th degree of north latitude.

It has already been mentioned that the people called by Europeans Burman or Burmese, called themselves *Mran-ma*, a name which is generally pronounced by them *Ba-má*. This word, as has also been stated, is of foreign origin. From the history we learn that at an early period there were three tribes in the valley of the Irrawaddy, who appear to have been the progenitors of the present nation. These

* Mr. J. R. Logan remarks upon this subject as follows:

"The present position of the *Mon-Anam* nations might lead us to suppose that they moved into Ultra-India, and thence into India. But the relation of the *Mon-Anam* to the Vindyan dialects shows, that the Dravirian traits of the former were wholly or chiefly acquired in Bengal, and renders it probable that they did not reach the south by the basin of the Irrawaddy, but by that of the Tsang-po Brahmaputra, like the later Tibeto-Burman tribes. How far Ultra-India was then inhabited, and what languages were there spoken, cannot therefore be ascertained from the character of the Mon-Anam languages." Again. "The *Simang* and *Anda-manni* are the purest remnants of a pre-Himalaic colony, and it is probable that similar Draviro-Australian tribes occupied it, so far as it was inhabited, before the Mon-Anam race entered the region." Journal, Indian Arch. pp. 156, 157. Among the traditions of the Mran-má race in Arakan, are traces of the existence of a hateful race of men, which existed *on the sea coast*, when the Mran-mas entered the country. They are called in the vernacular *Bee-loo* which implies a monster, or cannibal, in human shape. It is from these beings that the country received its Pali name of *Rek-khaik* and hence its present name Ra-khaing. Rek-khaik appears to have the same general signification as the vernacular *Bee-loo*. The Pali name being given to the country would seem to show that some *Bee-loos* were still there, when the Budhist missionaries entered Arakan. The word *Bee-loo* appears to answer generally in popular meaning to the English Ogre. There are no traces of the *Mon* people ever having passed through Arakan.

tribes are called *Byoo* or *Pyoo*, *Kam-yan* or *Kan-ran*, and *Thek* or by the Arakanese Sak.* They probably were three allied tribes, more closely connected with each other than were others of the same original stock, settled in the upper Irrawaddy valley, or on the adjoining mountains. I see no reason for doubting that they had found their way to the valley of the Irrawaddy by what is now the track of the Chinese caravans from Yunan, which track debouches at Bamo on the river. There they probably remained for many ages without being disturbed by any superior tribe. The history of the Burmese being written under the direct influence of the kings, it is not surprising that every effort should therein be made to show, that the royal race is descended from the kings of those people who brought to the Burmese letters, science, and religion; whereby the savage Indo-Chinese tribes of the Irrawaddy were civilized and made into a nation. Accordingly we find that the foundation of the state of *Kap-pi-la-wot* by a tribe of Rajpoots is carefully described, and as it appears to be admitted to be an historical fact that *Kap-pi-la-wot* was attacked, and the people dispersed, even during the life of Gautama, a previous emigration from thence to Burmah under Abhi Radza is invented for the national history. This name Abhi is native not Pali, signifying an ancestor in the fourth generation, and the names of his two sons, both called Kan, with the Pali word for king and the native terms elder and younger, added, appear to refer to them as acknowledged chiefs of the *Kan-ran* tribe. Under the two sons of Abhi Radza a separation of the tribes or of the people under their sway takes place; the elder branch going westward and settling in the country now called Arakan; the younger remaining in the valley of the Irrawaddy. In this legend there appears to be a germ of truth. The Arakanese also have the national name of Mran-ma. The country they inhabit received the Budhist name of *Rek-khaik* from the monsters believed to inhabit that wild unknown coast, and hence the modern native name *Ra-khaing* and the European Arakan. But this name has no connection with the race of the people. The Arakanese being of the same stock as the Burmese, and still acknowledged to be the elder branch of the family, undoubtedly entered their present country from the eastward, that is from the upper valley of the Irrawaddy, as their own

* Sák is still the name of a small hill tribe in Arakan. It is similar in *sound* to the name of the tribe Gautama belonged to.

traditions attest ; and it appears not improbable that this movement may have been made by the mountain passes which *Kan Radza-gyee* is described as having traversed to go westward. But according to the history this event occurred thirty-one generations of kings before the time of Gautama. That race, at the end of the thirty-first king's reign, died out in Tagoung, or rather was driven out by an invasion of northern hordes. A female descendant of the kings was preserved, and when the *Sakya* race of *Kap-pi-la-wot* was destroyed in the time of Gautama, or about the middle of the sixth century B. C., one of the princes of that tribe named Dazá Radza is again described as coming from *Kap-pi-la-wot* to the Irrawaddy, to continue the ancient race in that region. That wild Indo-Chinese tribes should find their way from the bleak north, down to warmer and more fertile climates of the south, is credible ; and that after reaching the Irrawaddy they should proceed westward across the mountains, and so reach the sea, is not improbable, as the more direct route down the Irrawaddy was already occupied by the *Mon*. That such indeed was their course is borne out by existing facts. But if we consider the present state of the countries lying between Bengal and Burmah, from Cachar eastward to the valley of the Irrawaddy ; and consider also the difficulties for travelling over that route, which must have been presented twenty-five centuries ago, the supposed emigration, either for conquest or colonization, by the comparatively civilized tribes of India, to the barbarous wilds lying east of Tipperah and Cachar, will appear very improbable. On the other hand it is highly probable that religious zeal would carry missionaries wherever a route for trade existed, however wild and dangerous that route might have been. It appears probable that a trade did exist from early times through eastern Bengal *viâ* the upper Irrawaddy to China.* Traffic is frequently carried on by very difficult routes, and by paths which people well advanced in civilization, in a fertile and extensive country, would not follow in search of a land to colonize. Merchants will venture into such countries, as is exemplified in the way the wild tribes east and northeast of Arakan are now supplied with salt, and other necessaries of life. Where traders go for love of gain, missionaries will go from religious zeal. From these considerations then, while the passage of Budhist Missionaries to Burma by

* The part of China bordering on Burma is called Tsein by the Burmese. Was the Indian name *Cheen* derived from this source ?

the difficult paths in question might be accepted, the supposed immigration of any of the royal races of Gangetic India to the Irrawaddy by the same route, in the sixth century B. C. or even later, will appear very improbable. Those tribes appear to have regarded Gangetic India as the favoured land of the earth, and would scarcely have emigrated to the savage country east of Bengal. There is indeed no good reason for supposing that any missionaries went to any part of the country now called Burma before the year 234 of religion,* when sent in the reign of *Dham-ma Asoka* as related in this history. But is the record of of *Yau-na-ka-dhamma-rek-khee-ta* being deputed by the third great council as missionary to Burma true? It appears not. The Budhist writings preserved in Ceylon inform us that *Oot-ta-ra* and *Thau-na* were deputed as missionaries to *Thoo-wan-na-bhoomee*. By that name no doubt is meant the country inhabited by the Mon or Talaing race, and their chief city then was on the site of the present *Tha-tung* lying between the mouths of the Salween and Sittang rivers. No doubt the missionaries reached it by sea. That gold was anciently found in that vicinity is testified from the Burmese name of Shwe-gyeen, literally "gold washing," now borne by a town on the Sittang, and gold is still found there, though probably in diminished quantity to what it was anciently. This no doubt was the origin of the name "Aurea regio" of Ptolemy. This history assumes that the Pali name *A-pa-ranta* means Burma. There is not the slightest reason for this conclusion. The word means western country and we must look westward from Gangetic India to find it. The fact is the modern Burmese, jealous of the Talaing people having beyond all doubt received a Budhist missionary in the time of the great *Dhamma Athauka*, determined to appropriate a great missionary to themselves. Portions of their country were also, after the fashion of all the Indo-Chinese countries, named from the Budhist scriptures, one Province being called *Thoo-na-pa-ran-ta*, and this name lent a specious support to the modern fraud or delusion of *A-pa-ran-ta* signifying Burma. But many other circumstances seem to show that the *Mon* or Talaing race, received Budhism before the Burmese did. Although the conversion of the people of Suvanna Bhumi was planned by people in Gangetic India, it is not probable that so essentially a sea-hating people had their own

* B. C. 308 or twelve years before Alexander crossed the Indus.

ships to convey the missionaries across the Bay of Bengal. Then how did they arrive at their destination?

We may be sure that the mission to *Suvanna Bhumi* was not planned like a voyage of discovery to an unknown land, but was determined on as a mission to extend religion to a country already known at least on its sea-coast, and the inhabitants of which were considered to offer a fair field for success. It is probable that the people of the Coromandel Coast already had settlements on the Arakanese and Talaing coasts as places of trade, and the Budhists of Gangetic India would in all probability resort to some of the ports on the east coast of the continent, and not far from the head of the Bay of Bengal. At that time it is probable that the people of Telingana carried on commerce with *Suvanna Bhumi*, and the Budhist missionaries would embark in their ships.

It has already been mentioned that the Talaing people call themselves *Mon*.* They are called Talaing by the Burmese. How came the latter to give them this designation? Certainly it does not bear the sound of an Indo-Chinese word. It is probably derived from the word Telinga, and hence it appears that the tribes of the upper Irrawaddy, separated during long ages from the kindred tribes to the south of them, only came to know the Mon after these latter had settlements of Telingas on their coast.† These people no doubt extended their commerce into the interior, and hence the name, easily changed into *Talaing*, came to be given to the whole population. The same result of a partial knowledge of a leading race may still be seen. Until comparatively of late years, the Burmese mixed up English and all Europeans with the natives of India in the one common appellation of *Kulá* or western foreigners; and it is only since the war with the

* The Rev. Dr. Mason in his work on Burmah states his opinion that the Mon language is entirely distinct from all the Indo-Chinese languages of the tribes adjoining, and considers that *Mon* comes nearer to the *Kole* or *Ho* language as depicted by Major Tickell in the Journal of the Asiatic Society, Vols. IX. and X., than any other. Mr. J. R. Logan considers "the radical identity of the native pronouns, definitives, and numerals of the Kol with those of the Mon-Anam group as established." Both "groups in their glossarial basis, are branches of one formation, much more akin to Tibeto Burman than to Dravirian." Jour. Ind. Arch. 1859, p. 66. For the connection between all the languages of the southern division of the Turanian family, see table No. IV. in Max Muller's Science of Language.

† There is said to have been a *Hindu* colony at Maulmain, the site of which was called Ramapoora, vide Crawfurd.

British of 1825-26 that they have learnt to distinguish between the more prominent of the nations lying west of them.

But the fact still remains that the Burmese received religion and letters from India. Did they receive these through the Talaings or from an independent source? It is certain that they had no direct intercourse with the sea probably until the second century of the Christian era. Their alphabet differs in some degree from that of the Talaings, though both are formed on the Deva Nagri model. The circular form of the letters of both indicates the influence of the Tamulic letters. The Burmese appears the more perfect of the two, and has probably been formed at a later period than the other. It does not appear that the Burmese people received their religion and letters through the medium of their cousins the Arakanese, for that people refer to the eastward as their own source of both. The passage of Indian Budhist missionaries therefore from Gangetic India through Bengal and Munnipore to Burma, is a probable event, but it took place much later than has been represented. The only direct evidence we yet have on this subject, is the discovery of a Budhist image at the ancient capital Tagoung, bearing an inscription in the Deva Nagri character as described by Colonel Burney in the 5th volume of the Journal of the Asiatic Society of Bengal, page 157. This image was found to have a Sanscrit inscription, being the well known text of *Ye-dham-ma* &c. &c. This is not the only inscription of the same kind that has been found at Tagoung, and the fact appears to indicate that Tagoung received missionaries direct from northern India. The character in which the above text is written on the base of the image is considered by Prinsep as coinciding with the letters of the inscription No. 2 on the Allahabad Budhist pillar.

We may then conclude that the rude tribes inhabiting the valley of the upper Irrawaddy, who at that time, like the hill tribes of to-day, worshipped only the spirits of the woods, the hills, and the streams, were converted and civilized by Budhist missionaries from Gangetic India. A monarchy was then established at Tagoung, which gradually extended its authority, and appears from the history to have been overturned by an irruption of (so-called) Tartars and Chinese. The names given to the invaders are *Ta-ret* and *Ta-rock*. The latter word is evidently the same as *Turk* and is applied at the present day by the Burmese to the Chinese generally. The destruction of the kingdom

of Tagoung led to the establishment of a monarchy at *Tha-re-khet-te-ya* near the modern Prome. There, according to the history, a descendant of the ancient kings of Tagoung, after a series of wonderful events, succeeded to the throne of the king of the Pyoo tribe, which people was up to that time dominant in the country round Prome. Whatever this event as told may really mean, we may consider it as certain, that the tribes dwelling in the country round Tagoung, where Budhism and some degree of civilization had been established under a powerful dynasty, were overwhelmed by a horde of invaders from the north-east, and that many of them found a refuge among their kinsmen the Pyoos.

The present kings of Burma, as has already been stated, claim descent from the ancient Budhist sovereigns of *Kăp-pi-la-wot*. It may not be out of place here to mention some of the Indian and Sakyan customs preserved by the Burmese royal family. Among these are the marriages of half-brothers with half-sisters, a practice which does not exist in any other family in the kingdom; the ceremonial called *a-beit-theik* or pouring out of water on the accession of a new sovereign; preserving unmarried the king's eldest daughter; the figures of a peacock and of a hare, symbolical of the sun and moon, and typifying descent from the solar and lunar races, being painted on the king's throne. For the same reason the figure of a peacock is borne on the royal standard. One of the royal titles is "sun-descended monarch," and a title of honour frequently bestowed even on foreigners is that of "Member of the race of the sun;" while the badge of nobility is the caste-thread of the Brahman and Rajpoot tribes represented by golden chains worn slung from the left shoulder, across the breast and back, to the right hip. These and some other customs are tenaciously adhered to by the royal family of Burmah, who consider themselves as ethnologically and religiously the descendants of the Budhist kings of Kap-pi-la-wot.

Account of further intercourse with the Natives of the Andaman Islands.

(Extract from a letter from COL. TYTLER, *Superintendent of Port Blair, dated the 14th January,* 1863.*)*

I enclose notes from our daily interview with the aborigines; though not very interesting, still they may afford some idea. I think the time has now come when we may reasonably expect a friendly intercourse with them;—pray let me know your views; this is the first time they have ever been so friendly, and their women are now coming forward. Smith and his crew have beyond all doubt gained their confidence, so I will encourage him as much as possible in this important duty.

For upwards of a month a body of aborigines have been seen at North Point and in their canoes in North Bay, and when boats have gone near them, they have evinced a friendly feeling towards Europeans, although they are distrustful to natives, and on one occasion they entered a boat containing a crew of Europeans, and danced; this has induced me to desire that some, if possible, could be persuaded to visit Ross Island in order by kindness to establish a friendly intercourse; accordingly I suggested to a party of the Naval Brigade to carry out if possible my views; and on the 7th inst., Smith a Petty Officer went over with six men in the jolly-boat, and found the natives very friendly; they came down to the boat, and received bottles, plantains and pieces of old iron which were given to them, and in return they gave six bows and a lot of arrows and waist belts; this is a large party, and a fresh arrival here, they are all evidently strangers.

January 8th.—Smith and the same party of Europeans went over again in the morning and had a long interview with them, they gave their bows and arrows, and anything else they had about them, willingly in exchange for biscuits and plantains; this is the first time they have ever parted with their bows in such numbers. At noon, Smith and the same crew went across again to induce some to come over to Ross Island; though about 24 came down to the boat they did not like staying in her; at last two of them, a boy and a man, got into the boat, and as they shewed an inclination to cross over, they were brought to Ross Island where they had clothes given to them; they then walked up the hill to the Superintendent and then to the barracks; they shewed no signs of fear, only did not like being separated; they were much taken

with a looking-glass, and kissed it to see what it was, and then looked behind it to see who was there; the wooden floors of the bungalows and barracks astonished them at first; they seemed to wonder at the noise made when walking. They soon however got over that, and then danced vigorously, thumping as hard as they could and slapping their chests, at the same time singing; the boy was about 18 years old and the man about 25; the former shewed great intelligence, and both appeared docile; after remaining two hours they were taken back with lots of presents.

9th.—Smith and his crew going across this morning, the natives came down without hesitation, and several wanted to be taken to Ross Island; five were brought over, one of whom was over yesterday; all the way across he was talking to the others and pointing out the different places, and on reaching Ross Island he took the lead on shore. On coming into the officers' quarters where they were at breakfast, they wanted every thing they saw on the table, and did not scruple to help themselves to whatever they fancied. They were all young men, very short, from 4 ft. 6 in to 4 ft. 10 inches in height, roughly tatooed, very black, and all except one quite bald; the hair is very woolly, and very thick and short; the hair of those that were quite bald had evidently been shaved;—one had a little crop of hair on his head; they were taken to see the pigs and were very much astonished at seeing such large ones, and seemed to wonder why they were shut up. A box was put up for them to shoot at with their bows and arrows;—they shot very well at 30 yards, but beyond that they were uncertain, though they shot with considerable force. A pig was given to them to take away, and some dogs; on taking them back, three women were seen, the first that have ever shewn themselves to Europeans, and some of the men went on shore, and into the jungle; the natives wanted Smith and his crew to stop with them and sleep; they made signs that they would soon make a hut and bed; their huts are the simplest things possible—three or four ratans stuck in the ground and bent together at the top, and a few leaves laid on loosely at the top; the height of them from the ground is only three feet, and for all the shelter they afford, one might as well be under a tree or bush. The fondness they evince for children was unmistakeable; when they saw mine, they stroked the head of my little son, who has long flaxen hair, and carefully tried to re-part the hair when they had

ruffled it a little. I mention this trifling incident to shew that they are not devoid of feeling, however savage they may have become from their miserable wild life, and I have no doubt but that the time has now arrived when we may reasonably hope to reclaim and civilize these children of nature. As they trust Smith and his crew, who certainly have gained their confidence, I will endeavour through their agency to accomplish my object.

10*th*.—It was some time this morning before any natives came down to the boat on its going across;—they probably were gorged with all they eat yesterday, for they had also killed and eaten the pig that had been given to them; but by going into the jungle to their camp, some were soon induced to come down, and also one of their women and two men; the woman came into the boat, and came to Ross Island; one of the men had been over on both the former occasions, and although clothes had been given to him each time, still he came over in a state of nudity; the woman also, with the exception of a waist belt, with a buff passing between her thighs, was quite naked; she was very timid and kept a tight hold of the man's hand, and was very observant of every thing; a large pig was shot for them to take away, and they stood by when the gun was fired, without expressing any fear or wonder as to how the pig was killed.—On taking them back, the natives crowded round the two that had been to Ross Island and had a long talk; they evidently had been afraid that we should have kept the woman, and were delighted to see her safe back; the woman was about 20 years of age, smaller in height than the men, very black and excessively African looking,—no hair on the head but a thin line in the shape of a long horse shoe extending from the centre of the head downwards, so, Ω, and the skull daubed over with clay; for decency's sake, the sailors put a sort of jacket and gown around her. One of the men had his right foot amputated, and his right ear nearly cut off,—evidently an old warrior, and about 40 years of age, but not grey in his woolly head of hair;—the sailors made a crutch for him with which he was delighted and used it well;—the other man was about 30 years old.

11*th*.—Two men and a woman were taken this morning up to Chatham Island, and were there photographed, they were then brought over to Ross Island—the woman was very lively, and laughed a great deal, going about any where without the slightest alarm.

She had her head shaved, like the men ;—a little patch of woolly hair was left on the back of the head,—her height was 4ft. 4½ inches. The men appear to make the women perform all the work, and do not themselves carry any thing but their bows and arrows, and to-day when the boat got back from Ross Island, although only three women were on the beach and about twenty men, the women were made to carry all the things from the boat ;—the men helped in cooking the pig ;—the woman who came to-day was rather good looking, and about 20 years of age, very black, but with a pleasing countenance ;—she frequently repeated the name the sailors had given her (Madam Cooper—the former one being called Queen Nic)—she was very much struck with the appearance of our little children, and begged to have them to kiss ;—great respect appears to be shewn by the men towards the women, who appear almost to command the men, notwithstanding that they seem to do all the work for them ; this may be owing to the apathetic nature of the men ; they give every thing up to the women, who freely take from the men any presents they may have received. Amongst themselves they have a kind and friendly feeling ; —they appear to love dogs and small animals, which they hold and nurse with affection. I remark the men have an aversion to carrying anything, for when presents are given to them they try to get the sailors or even the convicts, to carry them. Both the men had their heads only half shaven, which gave them an odd appearance.

12*th*.—The second Launch went over with Smith and his crew, and remained there all day. Some of the men went on shore and cleared away a piece of ground on which they will build a hut ;—the natives watched the proceedings very attentively, but on trying to get them to do anything in the shape of work they only laughed, and would try for a few minutes and then give up and point to their arms and legs. On the Launch returning for the evening, five men and three women came across, and were taken to the barracks, and a pig given to them for supper,—they singed the hair off first and then cut it up into joints and chops ;—they had a common knife to do this with, and no butcher could have done it better,—each joint came off as easily as possible,—they never missed the joint or had to cut twice. A room was given them in the barracks, and they passed the night quite quietly, —before dark they were rather anxious, and seemed to wish themselves on the other side again, but when they got their supper that wore off ;

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in the evening they sat outside near a fire and roasted plantains, yams, and fish, and were not at all timid, and quite pleased.

13*th*.—The Launch started from Ross Island with them, taking portions of a hut to be erected on North Point for them; but after proceeding some distance, it was, owing to an accident obliged to put back to Ross Island, so the natives or rather aborigines amused themselves by entering the bazar and receiving presents of rings, &c. &c. from the convicts and shop-keepers. In the evening, the Launch put off again, and as it was late when they reached the other side, the aborigines would not land but returned to Ross Island and slept in the boat with the sailors.

14*th*.—The Launch went over to North Point with the aborigines; this morning upwards of ten women came out to welcome the party;—the hut is being erected. Smith and his crew have not yet returned, and all promises to be successful, at least I hope so. I will continue this Journal, for I must now close this, to send off by the Burmah Mail Steamer.

Note on the Bactro-Pali Inscription from Taxila.—By Major-General A. Cunningham.

In his note on my remarks on the Taxila inscription, Babu Rajendra Lal states that according to me "the Hidda record opens with the words *Samvatsaraye athavisatihi*, 20.4.4. (= 28) *mase Apilaësa ekavisitihi;* but that, on referring to the facsimile in Ariana Antiqua, he finds that the only letters visible are 4 4 *mase Apeüsa chidasa*, and that the letters from '*Samvat*' to '20' do not exist in the original."

A similar remark has been made by Professor Dowson on my previous reading of this date as 28, (see *Royal As. Soc. Jour.* Vol. XX. p. 230). The Professor's words are as follow: "The inscription on the Hidda jar appears to be the earliest date known, the year being ✕ ✕ = 8. Col. Cunningham in his last paper on these dates reads it as consisting of three figures, but this is a mistake, as there are only two figures."

Notwithstanding these rather startling statements of two well known scholars, I adhere to my reading as noted in the extract from

Rajendra Lal's remarks. The words which are so confidently stated not to exist in the original will be found at the end of the upper line in the copy of the inscription in Ariana Antiqua. As this record is stated to be inscribed on an earthen jar, I concluded that the writing was *continuous* round the vessel, and that Masson in making his copy *in a straight line*, had begun with the two remarkable crosses, simply because he was obliged to begin somewhere; and, as it is certain that he could not read a word of the inscription, I felt no hesitation in transferring the last twelve letters of *his* copy of the first line to the beginning of it.

Rajendra Lal specially objects to my reading of the letter *l* in the word *Apilaësa*, as, in his opinion, the word of the original cannot by any possibility have an *l* in it. In reply to this I need only refer the Babu to the very same form of the letter *l*, as read by himself *throughout* the Wardak inscription. I therefore adhere to my first reading of *Apilaësa* for the Macedonian month of Apellaios.

I note that Professor Dowson reads *aṭṭa* for eight, whilst I read *atha*. The latter form is that which is used in the Indian Pali inscriptions of the western caves,* and it is also the spoken form of the present day. Moreover I look upon the character, which he reads as a double *ṭ*, to be only a slight modification of the *th* of the Shâhbâzgarhi inscription. For these reasons I adhere to my own reading.

Rajendra Lal objects to my reading of the word *Panemasa* for the Macedonian month of Panemos, for which he proposes to read *pancha-masa*, or the "fifth" month. But there is a serious objection to this reading in the fact that we have no grounds whatever for assuming that the Hindus ever numbered their months beyond the *four* months of *each* of the *three* seasons into which the early Indian year was divided. There could not therefore be a fifth month. It is true that both Dr. Stevenson and Mr. Thomas Lane managed to squeeze 32 days into a fortnight, but this has only been effected by misreading the final ill-formed letter of the word *batiya* as a cypher for 30, thus making "*bati* 32" instead of "*batiya* 2."†

With reference to Rajendra's correction of my translation, I beg again to state that I only put it forth as an "imperfect version of *such parts* of the inscription as I had been able to make out," (see

* See Bombay As. Soc. Journal, Vol. V. Junir 24, and Nasik 6.

† Bombay Journ. As. Soc. Vol. V. Karli 18, line 3.

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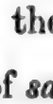
p. 139, *Journ. As. Soc. Bengal*, 1863). On all questions of Sanskrit Grammar, I bow to Rajendra Lal's acknowledged learning, and I have therefore only a few words to say regarding his remarks. The word *sapatika* (or *sepatika* in Professor Dowson's copy) I left untranslated—but the next word, *apratiwâḍita*, I rendered by "matchless teacher" as a simpler and more characteristic expression than the more literal form of "unopposable in argument." I translated the words *saputra-dâra*, as "together with his son's wife," instead of "together with his son *and* wife," because I believed that if the latter sense had been intended, the word *cha* "and" would have followed *dâra*.

In page 153 Babu Rajendra accuses me of "dropping altogether the *vre* before *hi* in my reading of the date of the Wardak inscription;" but in making this statement he is again mistaken, as he will find by referring to p. 145 of my remarks, where there is a star, thus * before *hi*, which is the usual way of marking that a letter is not satisfactorily legible. But besides this prominent star, the Babu will find, only just two lines afterwards, the following remark: "One letter only is doubtful, although according to the form given to it in the copy, it should be *ste*, or perhaps *vri*." The insertion of the word *divasa* in my first reading was a simple oversight, as the Babu might have seen by its omission in my last reading.

In the engraving of my inscription from Ohind, the straight stroke which follows the syllable *San*, and precedes the figures, is a mistake of the engraver. On this part of the stone there is a slight irregular crack the whole way across it, which has been *straightened* and *shortened* by the engraver into a thick upright stroke, which looks exactly as if it was a part of the inscription. I notice this the more particularly, because Professor Dowson has thought it possible that this stroke might, if it meant any thing, stand for 100.

With reference to the names of the Macedonian months, which I have read in no less than three of these Bactro-Pali inscriptions, Babu Rajendra remarks (see p. 152) that "the system of naming days according to the moon's age is peculiarly Sanskritic, and the division of the month into the light and dark halves of the moon is of Indian or Sanskritic origin." On this point I wish to draw the Babu's attention to the practice of the ancient Greeks, from Homer's time downwards, who divided their months exactly in the same way, namely into the "first" and "second" halves, μῆνος ἱσταμένου being the first

or waxing half of the moon, and μῆνος φθίνοντος being the second or waning half of the moon. This mode of computing the days of the month fell into disuse before the time of Alexander, as he is recorded to have died on the 28th day of Daesius.

I may note here, with reference to early dated inscriptions, that Professor Hall's conjecture that the Budha Gupta inscription of Eran had a figured date of three cyphers, as well as a written one, is correct. The date is given in figures, *San* 165. The middle figure is the same as that to which Mr. Thomas has assigned the value of 50; but the true 50 is formed thus, , and the 60 both of this inscription and of the coin is found differently thus, . The cypher for 40 as found on Skanda Gupta's coins is like the Bactrian *ch*, , or the *pt* in Gupta characters. The decimal cypher on Budha Gupta's coins I read as 70. In the early Indian system of notation, there would appear to have been two distinct cyphers for 100. Thus on the Gupta coins, and in the early Mathura inscriptions, I find the Bactrian letter or *h*, the initial of *hat* or 100 in the spoken dialects of the West; but on the early coins of Ujain as well as in the inscriptions of the Balabhi copper plates, the cypher for 100 is the old Nâgari  or *s*,—the initial letter of *sat*, or 100; and this same letter is still used in Malabar in the old form as the cypher for 100. The other centenary numbers are formed by *attaching* the units on the right hand of the cypher for 100 thus is 200, is 300, and is 500, in the series formed from . In the other series we have or for 100, and also for 100 in the Budha Gupta inscription, and in one of the later Mathura inscriptions I find the date of *Samvatsara* which I read as 780, but with considerable hesitation. This system of forming the hundreds by joining the unit figures to the centenary cypher I showed to Mr. Griffith of the Benares College, as well as to Mr. Bayley some two or three years ago. For the cypher of 500 I am indebted to Dr. Bhau Daji: but, as will be seen above, I do not agree with him in the forms of the figures for 200 and 300.

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Remarks on the "Lake of the Clear Water" in the District of Bassein, British Burmah.—By E. O'Riley, *F. G. S., Deputy Commissioner, Bassein.*

One of the most material branches of the revenue of the Province of Pegu is that derived from fisheries, which, as the purchase price of the monopoly of lakes and rivers, tax upon nets and other apparatus for catching fish, produces to Government the large item of 4,20,000 Rupees annually. Of this item about one-third is formed from the rent of fresh water preserves situated above the tide-flow in the principal rivers and their affluents; and when that amount is taken as a base of valuation for the quantity of fish obtained, bearing in mind that it represents simply the *right* of fishing only, it will be found that this source of sustenance of life assumes a character almost miraculous; in fact even those who regard the products of nature only as a means to the end of their own wants, can form no appreciable idea of the magnitude of the gift a bountiful Providence has thus bestowed.

Considering the subject of sufficient importance scientifically to engage the interest of the enquiring mind, I have taken as "data" the "Lake" of these remarks, a preserve formed by nature to supply the waters of the main river with a never-failing source of human sustenance, and characterized by geological features that render it the more interesting on that account.

The subjoined rough sketch shews the position of the Lake; its circumference is about 5 miles with a pretty uniform breadth of 280 to 300 yards and depth from 20 to 45 in the centre; it is connected with the "Dugga River," a large branch of the "Na-woon" or Bassein River, by a small outlet which serves to replenish the water of the lake at the period of the freshes from the Irrawaddy during the S. W. monsoon, and carries off the surplus water on the subsidence of the river. In both the small streams indicated forming the inlet as well as the main river, the water is shallower than that of the lake, and the general breadth of the latter greater than the river, so that, notwithstanding the impression on first view of its having at some distant period formed a part of the river, a subsequent exploration induced the conclusion that the lake has been formed by causes totally independent of stream-action, and from the homogeneous character of the formation of its

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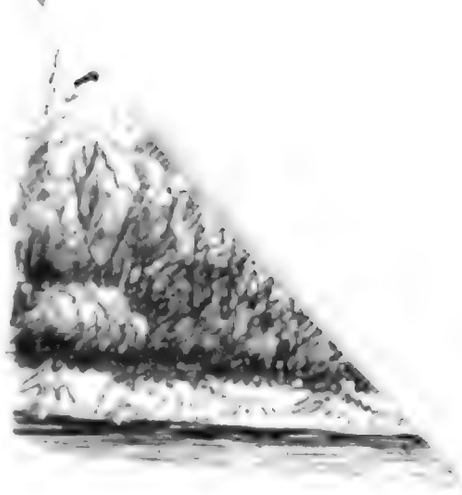
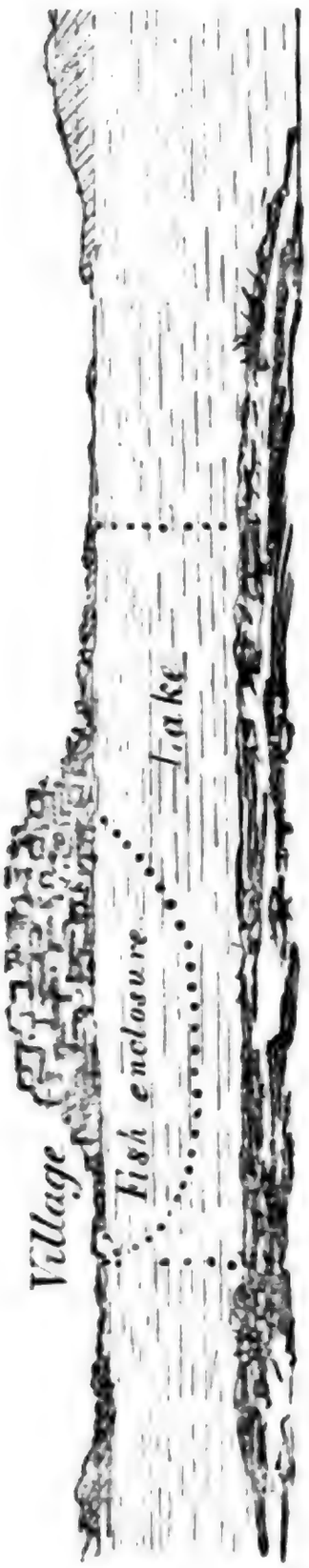
banks, without any material break in its uniformity of outline, its origin may be attributable to a gradual subsidence of the substratum, or a slip of the lower-lying beds of the tertiary shales and clays upon which the lake rests. It is certainly the fact that the water of the lake when relieved of the surcharge from the river has a different colour (dark opaque olive) from that of the river when uninfluenced by the efflux from the Irrawaddy, and its properties are such as to cause the fish in it to attain a larger size and greater degree of fatness than those of either river or lakes in the vicinity. It may be concluded therefore that at a period perhaps coeval with that of the river itself, the springs which now feed the lake broke through the superior beds, leaving the present circular depression with its Island as one of those eccentric feats of nature usually classed as phenomena.

As a "preserve" for fish to which their natural instincts would direct them for purposes of spawning and breeding, it will be seen that the lake is eminently adapted; and I am informed by the villagers who reside on its banks that after the rains of the monsoon have filled the water-courses, and the "Dugga" has become swollen and rapid, the fish seek the still waters of the lake in vast numbers, making their entrance through the small channel and shallow water at its southern entrance, where the land is low and swampy; this entrance is left open until the fish have passed through, it is then closed during the height of the waters; and on their subsidence, when the channel has become too shallow to admit of the fish escaping, it is again opened.

Under the Burman Government, this lake had a far-famed celebrity from the abundance and excellence of the fish caught on the occasion of the annual drawing of its bed during the full moon of June; on which occasion, traders from Ava, from Prome, and the larger towns on the Irrawaddy, assembled to make their investments in smoke-dried fish cured on the spot, while the fish-dealers from Bassein, and other towns on the lower streams, as at present obtains, purchased the fish alive, and transported them in bamboo cages immersed in the water, from which they were sold still in a live state; owing to the profits realized in this trade, the competition for the purchase of the fish at the lake became so great, that it was not unusual to make advances several seasons previous to the completion of the contract.

So valuable a source of revenue to the Burmese Government as this fishery afforded, was not allowed to escape easily; accordingly the





sum of 60 viss of silver or about 6000 tickals annually was exacted as a Royal tax from the "Payhnen" or hereditary chief of the lake, who exercised sole authority over the villagers employed in the fishery, and, with his subordinate officers, formed an establishment separated in its interests from all other administrative proceedings. The conditions of the payment of this amount of tax were, however, favorable to the villager, as he was exempt from all other process of taxation, and in proportion to his means had a right of investing his capital in the general working of the fishery, the purchase of material for weirs, traps, nets, &c. in proportion with which amount so invested, he received a share in the out-turn at the end of the season.

Writing this memo. on the lake itself, I have been witness to the process of drawing it, so as to enclose the fish within a small space from which they are taken out and sold, and, as I am not aware of any other fishery in Burmah in which the work involved is so extensive, I shall endeavour to give a brief description of it.

On the cessation of the rains of the S. W. monsoon, when the water of the lake has attained its lowest level, a fixed weir is placed across the lake at its shallowest part (marked A on the sketch,) and another at the point B; a drag net of reeds and grass strongly constructed with the toughest jungle creepers, forming from its great length of about 1800 cubits a deep concavity, and sweeping the bed of the lake, is then placed across, inside of the weir at A, and gradually moved round the lake in the direction of that at B; the process of dragging the frame is performed by floating capstans worked by stout hawsers of jungle rope attached to the ends of the frame, which by this tedious process is carried forward during three months at about 45 fathoms each

day, until it is brought opposite the village marked C on the sketch ; a fixed " weir" of bamboo is then made across the lake to form the one side of the enclosure into which the fish are driven; the ponderous mass of framework is now taken to pieces and reconstructed across the water at the point B, from whence it is dragged to the weir last fixed at the village, and the ends gradually contracted until they form an oblong space within which the fish are enclosed.

When the length of the weirs and of the moving drag frame is considered (about 900 yards,) and the depth of from 12 to 30 ft. of the latter, together with the excessive labour in moving so large a body in one mass, it will be a matter of surprise to learn that the sum of 3000 Rupees is annually paid by the Een Thoogyee or Chief of the Lake for the privilege of monopoly of its waters, but as no Burman can be brought to appreciate the value of his own labour when employed in his own work, this essential charge, (which would swallow up the entire profits of the speculator were he necessitated to hire such labour), forms no item of the estimate, and each man employed counts as gain all the fish which come to his share after paying any substantial expense he may have incurred during the period of working.

The taking of the fish from the enclosure into which they are ultimately driven is deferred until the full moon of June, by which time the first showers of the monsoon have reduced the temperature of the water, and the fish are then less subject to die than would be the case with the full blaze of the sun, unmitigated by the rain, striking upon the crowded mass; with this precaution, however, a large number of fish die before the whole has been cleared, and the stench of their corruption taints the air for miles around.

Being unable to stay to witness the final process of catching and disposing of the fish, I am dependant upon the Chief of the Lake for the following description, and as his interests are affected in depreciating the amount of outturn, the quantities stated may be considered as within the actual.

On the near approach of the drag-net to the space forming the enclosure, the fish are observed to be in great commotion, rushing in all directions and attempting to force their way through; finding the net too strong, many of the larger kind attempt to leap over the barrier, which they effect, only, however, to fall into nets spread to catch

them ere they reach the water; as the space becomes more confined, the disturbance of the mass of fish becomes so great that the noise of the splashing, and especially the deep hollow "grunting" of the larger kinds, is heard at several miles distance, and although this may appear tinctured with a little exaggeration, it will be intelligible when the number of fish caught is never below 70,000 to 80,000 of all kinds, some of which weigh upwards of 15 viss or about 60 lbs.; and mixed up with the mass it is not unusual to find alligators of all sizes, from the infant of a month, to the grown parent whose skull measures two cubits in length. Strange to relate, no accident or casualty has ever been known to occur from the presence of alligators in this lake, although the men employed in working the drag net are constantly compelled to dive to the bottom in the deeper parts, to clear the lower portion of obstructions in its bed, and I have myself seen an ancient member of the family, whose length could not be short of 15 ft., lying lazily on the surface within 100 yards of a cluster of children bathing near the bank.

During the taking and disposal of the fish, some 8 to 10,000 persons are collected at the small village in front of the preserve, a bazar is formed, and temporary sheds for smoking the fish are built, where the principal amount of business is transacted; the scene altogether is novel and exciting, and, but for the fishy odour, fresh and corrupt, which pervades the atmosphere, would be well worth the visit of the curious observer.

I omit the native names of the principal fish; they belong, however, to the following genera,—*Perca*, *Cyprinus*, *Gobio*, *Labeo*, *Pimelodus*, *Cirrhinus*, *Cyprinodon* and *Silurus*, some of which attain the large size previously noted. In addition to these, however, there is a multitude of smaller fry which are converted into the coarser kinds of "Nga-pee," and are only interesting to the Ichthyologist, who would here find a large field for observation.

But of those named above, some 25,000 viss, or upwards of 40 tons, are annually disposed of on the spot, and, taking the amount of revenue paid for this fishery or 3000 viss as representing 40 tons of fish, we have for the whole of the fresh water fisheries of Pegu an amount of upwards of 1800 tons of fish annually supplied to meet native requirements, an item considerably within the actual production, but which will

serve, however, to exhibit the value of the inland fisheries as a soure of Government Revenue.

The accompanying rough sketch will give but a faint idea of th beauty of the scenery of the lake or of the picturesque sites of th villages on its banks; it must be seen to be fully appreciated.

Extract from a Report on the Dependency of Bustar.—By Captai C. GLASFURD, *Deputy Commissioner of the Upper Godaver Districts.*

In comparison with the extent of the Dependency, there are not a many objects of interest as might be expected. None of the previou Rajas of Bustar have erected temples or any permanent buildings and were the present dynasty to pass away, they would not leav behind them a single edifice of any description to commemorate their rule. It was different with the ruling power whom they appear to have displaced, viz. that of the Nagbunse Rajas of Barsoor and Bhyrumgurh. Although it is nearly five hundred years since their power was broken, and their name has been all but forgotten, yet no one can see the ruined temples at Barsoor without instituting a comparison between the past and present rule. It is not that the former were greater than many other petty Rajas, but that the present are so inferior. The ruins of the ancient Barsoor, said to have been the capital of the previous power, are to be traced close to the north of the present village of that name, through a dense jungle of bamboo which has overgrown the site. A high brick wall, the ruins of which are now difficult to follow, seems to have enclosed a space of about one square mile; whether the city was contained within this I am unable to say; but within it there are the ruins of four or five temples. They are at some little distance from each other, and from the masses of rock of which they have been constructed, and the richness and beauty of their sculpture, impress one with a favorable idea of the taste and wealth of those under whose rule they were built. Three are in a tolerable state of preservation, one sacred to Mahadeo and another to Peddama, the sister of Dunteshwarree, the original representation of whom was removed to Duntewara by Dulput Deo, Raja of Bustar.

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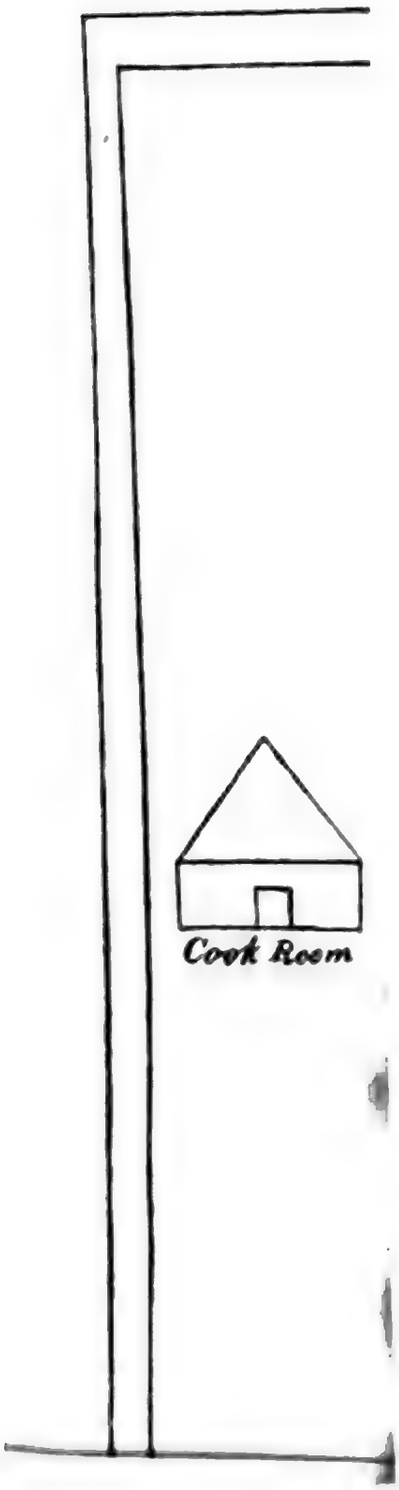

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The third appears to have been unfinished, as most of the niches intended for idols are vacant, and there is no representation inside. The fallen ruins of three others testify to the damage wrought by the insinuating roots of the *Ficus Indica;* persons digging for concealed treasure have also facilitated their destruction. The first temple is a flat roofed building supported on 32 pillars, under which are two distinct shrines to Mahadeo, the domes over which have fallen down, carrying part of the roof and wall with them. The whole building is composed of massive blocks of gneiss quarried in the neighbouring hills, well dressed and put together apparently without the aid of mortar ; around and inside are a few idols, all of steatite ; they are as minutely and elegantly carved as any I have seen, with perhaps the exception of some of the better temples at Vizanuggur on the Toongabuddra near Bellary. In front of this temple I found a slab with an ancient Sanscrit and Teloogoo inscription on both sides ; part of it had been broken off and was nowhere to be found ; after offering a reward and causing search to be made, I had the satisfaction of obtaining it. As the Teloogoo is of an antiquated character, I regret to say I have not succeeded in obtaining an accurate translation of the inscription ;—a fac simile is appended. From what I can ascertain it would appear that the temple of Mahadeo, where the slab was found, was built by a Rajah Someshwur Deo a Nagbunse Kshutrya in the year 1130 of the Vikramaditya era, viz. about 790 years ago. I would be glad to receive information on the subject from any one who is able to decipher the character, and whatever further information I may glean will be communicated.

A gigantic representation of Gunputty, about 10 feet in height and stout in proportion, is one of the most remarkable objects among these ruins. There is one large tank in good repair at Barsoor, and several old ones, and I was told that within a circuit of about 15 miles the ruins of about 150 tanks could be counted. At Bhyrumgurh in the Kootroo talook there are the ruins of two temples within a walled space similar to that at Barsoor.

At Duntewara again on the western bank of the Dunkunee, close to the present village, there are the remains of two temples, one sacred to "Bun Bhyroo ;" the remains of a brick wall similar to that of Barsoor can also be traced. I was much struck with the quality of the bricks. I presume they were built shortly after the buildings which they

enclose, and if so they must be at least 500 years old. The bricks were as hard as if they had been taken out of the kiln but yesterday. I could not gather any traditions in the neighbourhood connected with these remains of a former power. All that I have been able to collect is given in the chapter on History and Traditions.

The ruins of Madhota, one of the former capitals of the Bustar Rajas, along with those of Old Bustar, are hardly worthy of remark. There are no buildings of a permanent structure, and the remains of mud walls and ditches are all that can be traced. Near Rajapoor, a few miles north of Chitterkote, there are the ruins of a palace built by Rajpal Deo; his favourite son having died at Madhota he wished to remove his capital to Rajapoor; owing, however, to its vicinity to the Narenjee river, it was subject to inundations, and the people could not be induced to remain there, and upon the death of Rajpal Deo, soon afterwards, the palace was deserted and fell into ruins.

लोपी सीला

दंतावलादेवी जयती॥ देववाणीमहाप्रशस्तीलीषयेगथर हैय॥ महाराजादीकपाल देवके॥ कलीप्रगमहंसकृतके वच वो अघोर होइत्॥ पाहदुमरपाथरमाभाकीलेहये॥ सोमवंती पांडवार्जुनके संतानतरकानहस्तीनापुरकोडीके आवरंगलके राज्य भई॥ बंश-मडीकाकती प्रतापरुद्रनामराजा भई राजासीवके बंश नउला उच्चा-नुनकके ठाकुरजीके राज्य सुवर्ण बरसा॥ भयते राजाके भाई अंन्न-मराजबस्तरमे राज्यभये आवरंगलकोडीके॥ ताके संतान हमीर-देवराजा भये॥ ताके पुत्र भैराजदेवराजा ताके पुत्र पुरुषोत्तम-देवमहाराजा॥ ताके पुत्र जयसिंगदेवराजा ताके पुत्र नरसिंगराय देवमहाराजा जेकरमहाराणी॥ लक्ष्मादेवी अनेकतालवागकरी-सोरहा महादानदिये ताके पुत्र जगदीप्रराय देवराजा ताकेपुत्र

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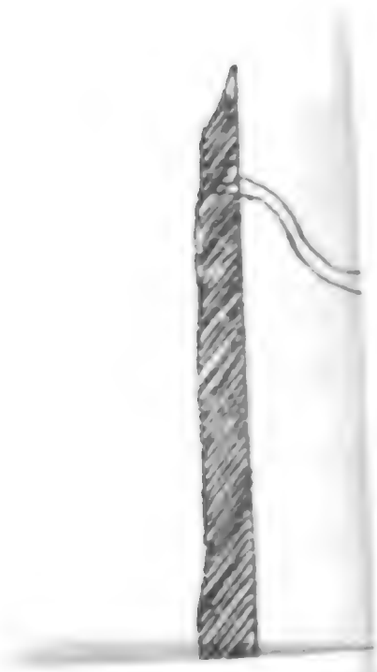

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वीरनारायणदेव महाराजा ॥ ताकेपुत्र कीरसिंगदेव देवसमाधर्म अवतार पंडोतदाता सर्वगुणसहीतदेवब्राह्मणपालक चंदेलीसीव-वदनकुमारी महाराणी वीधेदंतावलाके प्रसादते दीकपालदेव पुत्र पाणसंतानशतमहीवरसराज्यकरदीकपालदेव देवकहंराज्यो सोपो-के वैशाषीपूर्णमामहंमप्रणयास अधीवैकुंठ गये ॥ ताके पुत्र खस्त श्रीमहाराजाधीराजा सकलप्रशस्तीसहप्रपूर्णराजके अवतार बुध-गणे भूवनभीमसोमकामपन परशुराम दानकरण अर्जुन अवल सु-मेरनसीलसागररीके कूम्भवेरतेज्यापोलकीके यमप्रताप अमीषां-डाधरेनोररीतीसहे श्रीधरे बरणसेनासकारदारंभ्रवबदैतमहादेव आचारब्रह्माविद्यासीसनागणाऊ अतीदिकपालके गुणादीपंडितवाम-नदिकपालदेवनामधरेतेदीकपालदेवनो अहकीकवाहदीके चंद्रहारा-वरतनराजाके कन्या अजापकुमारी महाराणी वीधे अंगरहैवर्ध-रसपाल देवनामंजुवराज पुत्र मणतवला तेन तरंगपुरढोल ओरिको ही सकलं वदकरीजगंनाथवस्तर बैठके फेरी आवरंगपुरदेषे वोही आराजाथापै ॥

पुटेपांच ५ पंक्ति आहेतते समजतनाही

लीपी सीला

श्रीदंतावलादेवी जयती ॥ श्रीसोमवंशपांडवार्जुनकुलेकाकती प्र-तापरुद्रनामराजा अवरंगलदेशसंभवत् ॥ जेस्यदंप्यद्यानवलच्य धनु-र्धराचीनाथ प्रथ्वीसासती काकतीये रुद्रोभवत् ॥ परमयहारपीडा कुचकुम्भकुरंगलोचनानां ॥ तस्यैकदा सुवर्णवस्त्रीसंजाती पांडवात् ॥

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Enumeration of the hot springs of India and High Asia.—

By Robert de Schlagintweit, *Esq.*

A memoir by Dr. John Macpherson, "The Mineral waters of India, with some hints on Spas and Sanatoria," Calcutta, 1854,* which was published originally in the "Indian Annals of Medical Science" has been very valuable for the present compilation. Dr. Macpherson includes in his memoir, hot springs as well as mineral ones; I have, however, restricted myself to the enumeration of *hot springs only*, viz. of those, the temperature of which considerably exceeds the temperature of the air at the spot of their origin. I have, therefore, excluded every spring, which, though it may contain mineral ingredients, yet shows a temperature scarcely differing from that of other sweet springs in its neighbourhood. Petroleum wells are not contained in the present list, which comprises the hot springs between 8½° to 36° Latitude North, and 67° to 88½° Longitude East Green., Ceylon being excluded, as well as the Indo-Chinese peninsula (Tenasserim, Burmah, &c.)

To each locality, where a hot spring exists, the province is added, in which it is situated; of the abbreviations, which follow next, and which are contained in brackets, Ind. signifies "India; Him. = Himálaya; Tib. = Tíbet; C. As. = Central Asia." "Un." means unknown; ab. = about. The geographical co-ordinates,—latitude, longitude, and height (Eng. feet) above the sea-level,—given almost for every locality, are taken from Vol. II. "Hypsometry of India and High Asia," of our "Results of a Scientific Mission to India and High Asia." The longitudes are referred to the Madras Observatory, for which we adopt 80° 13′ 56″ Long. East Green.

With few exceptions, there are several springs existing at every one of the different localities; the temperatures given refer to the hottest of the springs at the respective locality.

Dr. Macpherson alludes in his memoir to the difficulties he experienced in verifying the localities of the hot and mineral springs "which in many instances, owing to strange transmutations of names were so great, that I cannot hope to have escaped mistakes." These are, however, very few in number, and they are noticed by me in the

* An extract has also appeared in this Journal, Vol. XXV. p. 197.

last column of the table, headed "Authorities and Remarks." In this column I have also added in chronological order the various describers of the respective springs, and the books and pamphlets in which their accounts have been published.

For the sake of comparison I add the temperatures of some of the most famous hot springs of Europe. These dates are taken from the "Einleitung in die Mineralquellen Lehre," by Dr. B. M. Lersch, Erlangen, 1855-60.

	Temp. Fahr.
Aachen: *Hottest spring,*	166°
Baden-Baden: *Brühquelle,*	155
Ems: *Rondelquelle,*	131
Gastein: *Hottest spring,*	119
Karlsbad: *Sprudel,*	162½
Plombieres: *Roman spring,*	158
Schlangenbad: *Hottest spring,*	90½
Teplitz: *Hottest spring,*	121
Vichy: *Grand Puits,*	113
Wildbad: *Herrenbad,*	99½

Alphabetical List of the hot springs of India and High Asia.

No. Cur.	LOCALITIES.	GEOGRAPHICAL CO-ORDINATES. Latitude North.	Longitude East Green.	Height above the sea-level.	Temperature Fahr.	AUTHORITIES AND REMARKS.
		° ′	° ′			
1	Alvár, in Rajvára,* (Ind.) ..	27 35	76 36	1,200	Un.	*Macpherson*, "The Mineral waters of India," p. 8.
2	Anavál, in Khandésh, ..	20 45	73 17	Un.	120.0	*White*, "Transactions R. As. Soc., 1833. The spring is called "Anakel Dévi."
3	Aráuli, in the Kónkan, (Ind.) ..	17 19	73 35	Un.	Un.	*Duncan*, "Journ. Med. Phys. Science," Calcutta, Vol. III., p. 524.
5	Askoli, in Balti, (Tib.) ..	35 41	75 56	9,710	168.8	*Messrs. de Schlagintweit.*
4	Arjána, in the Dékhan, (Ind.) ..	19 50	78 46	Un.	87.0	*Malcolmson*, "Geolog. Transactions," 2nd series, Vol. V., p. 554.
6	Bádrinath, in Garhvál, (Him.) ..	30 46	79 20	10,124	128.9	*Messrs. de Schlagintweit.*
7	Baidra, in Berár? (Ind.) .	Un.	Un.	Un.	110.0	*Malcolmson*, "Geolog. Transactions," 2nd series, Vol. IV.; p. 565; J. As. Soc. B., Vol. II. p. 397.
8	Banássa, in Garhvál, (Him.) ..	30 56	78 23	7,478	160.0	*Messrs. de Schlagintweit.*
9	Barári, in Bahár, (Ind.) ..	25 9	86 22	400	145.0	*Sherwill*, J. As. Soc. B., Vol. XXI., p. 198. Spring is called Janamkúnd.
10	Bargáñ, in Gílgit, (Tib.) .	36 0	74 10	Un.	Un.	*Messrs. de Schlagintweit*, from native information.
11	Belkápi, in Bahár, (Ind.) ..	24 9	85 38	1,219	190.0	*Wilson*, Trans. Med. Phys. Soc. Calcutta, Vol. III., p. 450; *Hooker*, "Himalayan Journals," Vol. I., p. 27; *Messrs. de Schlagintweit.* This is Macpherson's "Sooroojkund near Belkápi and Burkutta."
12	Bhadrachélam, in Orissa, (Ind.) ..	17 41	80 53	202	140.0	*Malcolmson*, "Geolog. Transactions," 2nd series, Vol. V., p. 565; *Messrs. de Schlagintweit.*

* Remarks for the transcription of the names: vowels and diphthongs as in Italian and German; á = u in "but;" a = an in the French "gànt." Consonants sound as in English. The sign ′ marks the syllable to be accentuated.

No. Curr.	LOCALITIES.	GEOGRAPHICAL CO-ORDINATES. Latitude North.		Longitude East Green.		Height above the sea-level.	Temperature Fahr.	AUTHORITIES AND REMARKS.
		o	′	o	′			
13	Bhátra, in Kúlu, (Him.) ..	31	54	76	51	Un.	Un.	*Wade*, J. As. Soc. B., Vol. VI., Part I., p. 153. This is Macpherson's "Lahad Khad."
14	Bhímband, in Bahár, (Ind.) ..	25	3	86	23	450	147.0	*Sherwill*, J. As. Soc. B., Vol. XXI., p. 199. The springs are called Mohadeva and Damdáma.
15	Bihísht, in Kúlu, (Him.) ..	32	17	77	10	6,622	138.6	*Moorcroft*, "Travels in the Himalayan provinces," Vol. I., p. 186; *Marcadieu*, J. As. Soc. Beng., Vol. XXIV., p. 200; *Messrs. de Schlagintweit.*
16	Chágrar, in Pangkóng, (Tib.) ..	34	2	78	6	ab.15.000	70.5	*Messrs. de Schlagintweit.*
17	Chatargárh, in Kishtvár, (Him.) ..	33	3	76	16	Un.	Un.	*Messrs. de Schlagintweit*, from native information.
18	Chittúr, in Rajvára, (Ind.) ..	24	52	74	1	1,100	80.0	*Hardie*, As. Res., Vol. XVIII., part II., p. 53.
19	Chorkónda, in Bálti, (Tib.) ..	35	31	75	58	11,594	185.0	*Messrs. de Schlagintweit.*
20	Chúa, in Chámba, (Him.) ..	32	8	76	30	Un.	110.5	*Messrs. de Schlagintweit.*
21	Chúshul, in Pangkóng, (Tib.) .	33	31	78	36	14,406	96.0	*Moorcroft.* "Travels in the Himalayan provinces," Vol. I., p. 436; *Messrs. de Schlagintweit.*
22	Chutrón, in Bálti, (Tib.) ..	35	51	75	50	9,970	111.6	*Messrs. de Schlagintweit.*
23	Darjíling, in Sikkim, (Him.) ..	27	3	88	15	ab. 1,900	Un.	*Smoult*, "Guide to Darjiling," Calcutta, 1843, p. 15.
24	Devát, in Chámba, (Him.) .	32	6	76	42	4,410	132 0	*Messrs. de Schlagintweit.*
25	Gaurikúnd, in Garhwál, (Him.) ..	30	36	79	3	6,417	126.8	*Messrs. de Schlagintweit.* This is Macpherson's spring at "Kidarnath."
26	Hathbúllia, in Bahár, (Ind.) .	24	11	87	15	310	Un.	*Sherwill*, "Report on Bhaugulpore," Calcutta, 1854, p. 25.
27	Hazaribágh, in Bengál, (Ind.) ..	24	0	85	21	1,750	Un.	*Everest*, "Gleanings in Science," Vol. III., p. 134. This is Macpherson's "Katkamsándi."
28	Hushangabad, in Málva, (Ind.) .	22	45	77	42	1,050	Un.	*Spilsbury*, "Gleanings in Science," Vol. III., p. 17. and Transact. Med. Phys. Soc., Calcutta, Vol. III., p. 450, The springs are called "Anhóni Samóni."
29	Imla, in Kámáon, (Him.) .	30	2	80	2	Un.	Un.	*Messrs. de Schlagintweit*, from native information.

30	Jaggarnáth, in Orissa, (Ind.) ..	19	48	85	46	40	Un.	*Brander* "Transact. Med. Phys. Soc." Calcutta, Vol. IV., p. 382. This is Macpherson's "Uteer, 30 miles from Poorie."
31	Jáipur, in Rajvára, (Ind.) ..	26	56	75	52	320	Un.	*Macpherson*, "The Mineral waters of India," p. 8.
32	Jamnótri, in Garhwál, (Him.) .	31	0	78	29	9,793	192.6	*Hodgson*, As. Res., Vol. XIV., p. 147; *Jacquemont*, "Voyage dans l' Inde," Journal, Vol. II., p. 89; *Messrs. de Schlagintweit.*
33	Jánglung, in Núbra, (Tib.) ..	35	0	77	8	11,890	165.8	*Messrs. de Schlagintweit.*
34	Jáuri, in Símla, (Him.) ..	31	32	77	48	Un.	Un.	*Gerard*, "Koonawur," p. 142.
35	Kaljhúrnia, in Bahár, (Ind.) .	Un.		Un.		Un.	Un.	*Macpherson* "The Mineral waters of India," p. 7, quotes Sherwill as authority, which must be a mistake.
36	Kálva, (Ind.) ..	..		..		..	Un.	*Newbold*, "Madras J. Lit. and Science," Vol. XII. or XIII., p. 16.*
37	Kelát, in Kúlu, (Him.) ..	32	14	77	12	5,700	104.0	*Cunningham*, Journ. As. Soc. B., Vols. X., part I., p. 3, and XVII., part I., p. 208; *Marcadieu*, Journ. As. Soc. B., Vol. XXIV., p. 200; *Gerard*, "Koonawur," p. 142; *Messrs. de Schlagintweit.*
38	Khair, in the Dékhan, (Ind.) ..	19	55	78	52	Un.	87.0	*Malcolmson*, "Geol. Transactions," 2nd ser., Vol. V., p. 556.
39	Kharsáli, in Garhwál, (Him.) ..	30	57	78	27	8,653	72.1	*Messrs. de Schlagintweit.*
40	Kisik-kiól, in Turkistán, (C. As.) ..	35	40	77	56	15,010	120.2	*Messrs. de Schlagintweit.*
41	Knárung, in Ladák, (Tib.) .	34	1	76	59	Un.	Un.	*Moorcroft*, "Travels in the Himalayan provinces," Vol. I., p. 416.
42	Kyám, in Pangkóng, (Tib.) ..	34	14	78	34	ab.14,000	147.0	*Messrs. de Schlagintweit.*
43	Lákhi, in Sindh, (Ind.) ..	26	16	67	54	150	104.5	*Messrs. de Schlagintweit.*
44	Lanjabánda, in the Dékhan, (Ind.) ..	15	30	78	1	1,250	91.3	*Newbold*, Journ. As. Soc. B., Vol. XIII., part I., p. 315. Macpherson's "Sunjabanda" is a misprint for "Lunjabánda."
45	Mággar Pir, in Sindh, (Ind.) ..	24	50	66	58	50	106.2	*Carless*, "Transactions Bombay Geogr. Soc." Vol. II., p. 14. Journ. As. Soc. B., Vol. XVII., part II., p. 230; *Messrs. de Schlagintweit.*
46	Mahanándi, (Ind.) ..	..		..		..	Un.	*Newbold*, "Madras J. Lit. and Science," Vol. XII. or XIII., p. 162.
47	Maháru, in Bahár, (Ind.) .	24	41	87	13	360	Un.	*Sherwill*, "Report on Bhaugulpore," Calcutta, 1854, p. 25.

* I was unable to procure this Journal.

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No. Curr.	LOCALITIES.	GEOGRAPHICAL CO-ORDINATES. Latitude North.	Longitude East Green.	Height above the sea-level.	Temperature Fahr.	AUTHORITIES AND REMARKS.
		o ′	o ′			
48	Manikárn, in Kúlu, (Him.) ...	32 2	77 22	5,587	202.0	*Marcadieu*, J. As. Soc. B., Vol. XXIV., p. 199. *Moorcroft*, "Travels in the Himalayan provinces," Vol. I., p. 177; *Messrs. de Schlagintweit.*
49	Mat, in the Kónkan, (Ind.) ...	16 57	73 31	Un.	Un.	*Duncan*, "Journ. Med. Phys. Science," Calcutta, Vol. III., p. 524.
50	Momái, in Sikkim, (Him.) ...	27 52	88 40	ab.16,000	110.0	*Hooker*, "Himalayan Journals," Vol. II., pp. 133 and 180.
51	Mónghir, in Bengal, (Ind.) ..	25 27	86 40	200	140.0	The spring is called "Sitakúnd" *Sherwill*, "General remarks on the district of Monghyr." Calcutta; *Hooker*, "Himalayan Journals," Vol. I., p. 88; *Messrs. de Schlagintweit.*
52	Múlbe, in Dras, (Tib.) ...	34 20	76 13	10,990	78.6	*Messrs. de Schlagintweit.* [*Schlagintweit.*
53	Musakhét, in the Pánjáb, (Ind.) ...	32 43	71 39	706	94.0	*Fleming*, "Journ. As. Soc. B., Vol. XXII., p. 265; *Messrs. de*
54	Múshkin, in Hasóra, (Tib.) ...	35 25	74 51	Un.	Un.	*Messrs. de Schlagintweit*, from native information.
55	Nákthan, in Kúlu, (Him.) ..	31 58	77 29	ab. 6,200	Un.	*Messrs. de Schlagintweit*, from native information.
56	Nátssa, in Simla, (Him.) ...	31 40	77 53	ab. 3,580	137.0	*Gerard*, "Koonawur," p. 142; *Messrs. de Schlagintweit.*
57	Nilt, in Gílgit, (Tib.) ...	Un.	Un.	Un.	Un.	*Messrs. de Schlagintweit*, from native information.
58	Núnbhil, in Bahár, (Ind.) ...	24 11	86 59	300	Un.	*Sherwill*, "Report on Bhaugulpore," Calcutta, 1854, p. 25.
59	Pachét, in Bahár, (Ind.) ..	23 36	86 48	420	Un.	Journ. As. Soc. Beng., Vol. II., p. 46.
60	Pahárpur, in Bahár, (Ind.) ...	25 22	86 41	320	114.1	*Sherwill*, "J. As. Soc. B., Vol. XXI., p. 204; *Messrs. de Schlagintweit.* The spring is called "Rishikúnd," Sherwill's "Kishikund" (Report on Bhaugulpore, 1854, p. 2,) being a misprint for "Rishikund."
61	Pámpur, in Kashmír, (Him.) ...	33 59	74 55	5,250	70.0	*Hügel*, "Kaschmir und das Reich der Siek," Vol. I., p. 260; *Messrs. de Schlagintweit.*
62	Pangmíg, in Núbra, (Tib.) ...	34 46	77 12	10,538	172.2	*Moorcroft*, "Travels in the Himalayan Provinces," Vol. I., p. 406; *Thomson*, "Western Himalaya and Tibet," p. 407; *Messrs. de Schlagintweit.*

63	Pánna, in Bandelkhánd, (Ind.)	...	24	44	80	12	Un.	Un.	*Macpherson*, "The Mineral waters of India," p. 8, on the authority of Capt. Franklin, which seems to be a mistake.
64	Pókar, in Gílgit, (Tib.)	..	Un.		Un.		Un.	Un.	*Messrs. de Schlagintweit*, from native information.
65	Pinarkún, in Bahár, (Ind.)	...	Un.		Un.		Un.	Un.	*Macpherson*, "The Mineral waters of India," p. 8, on the authority of Breton, which seems to be a mistake (see Trans. Med. Phys. Soc., Calcutta, Vol. II., p. 237, and "Sargúja.")
66	Puári, in Kanáur, (Him.)	...	31	33	78	18	6,555	125.0	*Messrs. Schlagintweit*; seems to be "Bokti" of *Gerard*, "Koonawur," p. 14.
67	Púga, in Ladák, (Tib.)	...	33	12	78	25	15,264	174.0	*Cunningham*, "Ladak," p. 144. Thomson, "Western Himalaya and Tibet," p. 164; *Messrs. de Schlagintweit.*
68	Rajgír, in Bahár, (Ind.)	...	25	2	85	25	Un.	Un.	*Sherwill*, Journ. As. Soc. B., Vol. XV., p. 59.
69	Rajvári, in the Kónkan, (Ind.)	..	17	14	73	35	Un.	Un.	*Duncan*, Journ. Med. Phys. Science, Calcutta, Vol. III., p. 524.
70	Sangaméshvar, in the Kónkan, (Ind.)		17	11	73	35	Un.	Un.	*Duncan*, ditto ditto ditto ditto.
71	Sargúja, in Bahár, (Ind.)	...	23	8	83	5	Un.	186.0	*Breton*, "Trans. Med. Phys. Soc.," Calcutta, Vol. II.; p. 237; *Ouseley*, J. As. Soc. B., Vol. XVII., part I., p. 67.
72	Sávi, in the Kónkan, (Ind.)	...	18	5	73	24	Un.	109.0	*Duncan*, "Journ. Med. Phys. Science," Calcutta, Vol. III., p. 524.
73	Shálkar, in Spíti, (Tib.)	...	32	0	78	38	10,600	120.0	*Gerard*, "Koonawur," p. 142; *Messrs. de Schlagintweit.*
74	Sheolór, in Kashmir, (Him.)	...	34	21	74	14	Un.	Un.	*Messrs. de Schlagintweit*, from native information.
75	Shogóre, in Chitrál, (C. As.)	...	35	8	72	4	Un.	Un.	Ditto ditto ditto.
76	Sitabári, in Málva, (Ind.)	...	Un.		Un.		Un.	Un.	*Colonel Todd.*
77	Sitáura, in Bahár, (Ind.)	...	25	3	85	29	Un.	110.0	*Sherwill's* "Madhuban," (notes on Bahar, Calcutta); Kittoe's "Taproban," (see Journ. As. Soc. Beng., Vol. XVII., part I., p. 235.
78	Sohóra, in Rajáuri, (Him.)	...	33	40	73	49	2,200	...	*Messrs. de Schlagintweit.*
79	Sóna, in Hindostán, (Ind.)	...	28	14	77	3	ab. 800	108.0	*Ludlow*, "Trans. Med. Phys. Soc.," Calcutta, Vol. III., p. 20; "Gleanings in Science," Vol. II., p. 44. *Martin*, "Journ. As. Soc. B.," Vol. XII., part I., p. 270; *Jacquemont*, "Voyage dans l'Inde," Journal, Vol. III., p. 337.
80	Sunapdéo, in Khandésh, (Ind.)	...	Un.		Un.		Un.	Un.	*Briggs*, cited by *Sykes* "Geological Transactions," 2nd series, Vol. IV., p. 427.
81	Súni, in Símla, (Him.)	...	31	15	78	8	2,127	135.0	*Ravenshaw*, "Gleanings in Science," Vol. III., p. 17; *Gerard*, "Koonawur," p. 142; *Messrs de Schlagintweit.*

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Memorandum upon some ancient Tiles obtained at Pugan in Burma.—*By Lt.-Col.* A. P. Phayre.

I send herewith four tiles having Budhist figures and inscriptions which were discovered at Pugan. They were given to me by the principal Monk of a Budhist Monastery there. I only saw one of the four kinds in the original site; viz. the tile marked No. 1. The Monk assured me that all were found in different parts of the ruined city, but he did not wish me to go to the several sites, being apparently afraid that I should carry away too many, and that he might be blamed for being instrumental in injuring ancient pagodas. As my visit on this occasion was a hurried one, I had not time to discuss the matter with the old Phoon-gyee, who was exceedingly obliging, but he gave me one of his scholars to show me the place where the tile No. 1 was discovered.

It was the ruins of a small solid pagoda. In one corner the foundation at the level of the ground was exposed. The tiles like that marked No. 1, were laid on edge, and apparently formed the upper layer of the arch of the relic chamber. The hollow portion of the tiles was filled with sand partially mixed with lime to resist pressure. Bearing in mind the fears of the Phoon-gyee I brought none of the tiles away with me, but after inspecting a few, replaced them.

I now proceed to describe the tiles.

No. 1 bears thirty figures of Budhas. Of these two which are distinguished from the rest are evidently the figures of Gautama. The remaining twenty-eight are apparently intended to represent the Budhas of an antecedent period. At the bottom of the tile are two lines in the Deva Nagri character. On the back are inscribed seven lines in rude Burmese characters, and in the Ma-ga-da, or Pali language. I give them in the Roman character as follows:

Ata wisa ti mé budhá
Ti gi thu mé ká tsa tha ha
Budhat ta ya Tat tat ta ya
Thabbau matu pitu a ya
Tsa ri ya putta ra rátsa
Thabba that ta hitá pitsa
Budhau hitháti nága teti.

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No. 2. This tile has eight groups or compartments of figures. Each no doubt represents a marked event or scene in the life of Gautama Budha though I cannot recognise all. The first is the group in the right hand, lower corner. It represents the birth of Gautama. He is issuing from the right side of his mother who grasps the *Shorea robusta* tree above her head, and is attended by her sister. The figure at the top where Gautama is seen reclining represents his death in the country of Koothinaron. At the foot are two lines of writing in ancient Deva Nagri character.

No. 3. A figure of Gautama Budha seated on a sort of throne and his feet on a foot-stool. Around him are what appear to be intended to represent pagodas or relic caskets. The modern pagodas of Burma and Siam appear to have been fashioned after such-like models. There is a Deva Nagri inscription below the figure.

No. 4, is a small tile in the shape of the leaf of the *Ficus religiosa*. It bears a figure of Gautama in the usual attitude of reflection, and a Deva-Nagri inscription below.

Literary Intelligence, Correspondence, &c.

Dr. Weber writes to Mr. Cowell from Berlin, November 9th, 1863.

"Out of the many interesting news contained in your letter of June 5th, that about the Elliot collection of course claims the greatest attention. Mr. Austin's estimate for the cost of printing appears exceedingly moderate. Your Sanskrit College edition of the Siddhánta Kaumudí will be welcomed very heartily, as it may be used as a text-book in our Universities' Sanskrit Courses. The Nágánanda too will be very welcome. Your translation of the Kusumánjali must be hard work and will do us a great service.

Bána's Harshacharitra is a work which seems of the utmost importance, to judge after the notices which we owe to Dr. Hall about it. I cannot as yet reconcile myself to the idea that the author of such a dull and clumsy work as the Kádambarí, should have lived in the seventh century, *before* Bhavabhúti wrote his dramas, which indeed show already *symptoms* enough of a kindred style, but still appear in that regard more to resemble a weak stem, whereas a Kádambarí is to be likened to a nyagrodha-wilderness.

The second part of M. Pictet's "*Origines Indo-europeennes*" has now appeared. It is a great pity that he is no better Sanskrit scholar. The principles laid out and followed throughout his work are the very best, his assiduity and ardour deserve the highest praise, but the results, alas, are rather too often of a too questionable character to admit of acknowledgment or adoption. Professor Spiegel has just now published a series of old and new papers on "Erán" (this is the title of his book): two of them on the relation of the Avesta to the Veda and to the Genesis will be of particular interest: I have not yet read them, but I saw Spiegel in Meissen and we spoke to him about these themes. That meeting in Meissen was a very interesting one, forty members of our German Oriental Society being present (a larger number, than ever hitherto). Professor Wright is now to print under the patronage of our Society an old Arabian grammar, the Kámil of al-Mubarrad (about 800 pages quarto). Dieterici is occupied with his translation of the treatises of the Ikhwán uç çafá. Gosche has given out a prospectus for an edition of the Mufaḍḥḍhaliyát, a collection of old Arabic poetry. Amari's publication of the state documents of

treaties between Venice etc. and the Moslems is highly praised. Emil Schlagintweit's Buddhism in Tibet with a copious Atlas of original drawings and pictures from the temple shrines of Tibet (representing Buddhist gods, saints and symbols) is a work of great interest. Curious enough, I found among these pictures the exact counterpart to a stone figure of Mañjuçri, deposited now in our Royal Museum here, but imported from Java, and containing two Sanskrit inscriptions in old character (from Çaka 1265), a decyphering and translation of which Dr. Friederich left with me (for the Journal of our Society) on his departure for Java at the end of February last. Five centuries between, and still the same picture in Java and in Tibet,—this is indeed a mark of much tenacity to the old form of representing this deity (or half god), and at the same time also an evidence for its even much higher antiquity. The last proof sheet of the Petersburg Worterbuch went to पृष्ठ and I think that number 5 of the fourth volume will soon be ready. The twelfth vol. of Kuhn's Zeitschrift fur vergleichende Sprachforschung is finished. It is a great pity, that Kuhn has not more leisure to devote to his studies on comparative mythology: he is professor at a Gymnasium (high school) and his time very much restricted. Windischmann's Zoroastrische Studien (edited by Spiegel) is a very excellent work. The author (a Catholic clergyman of high distinction in Munich) combined Burnouf's method with a very deep and successful study of the Pehlvi literature: his premature death is a great loss for science. The first volume of Boehtlingk's collection of Sanskrit "Sprüche" appeared in July: to the text (alphabetically arranged) is added the translation, and at the foot the enumeration of all the passages, where the verse is occurring, and the varietas lectionis. The second part is to contain the rest (from प to ह) and ample indices to the whole.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR NOVEMBER, 1863.

The monthly general meeting of the Society was held on the 4th instant.

E. C. Bayley, Esq., President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From His Highness the Maharajah of Benares, a copy of the Rev. M. A. Sherring's lecture on "Benares and its Antiquities."

2. From Baboo Rajendra Mallika, a dead blue and yellow Macaw.

3. From His Honor the Lieutenant-Governor of Bengal, a meteoric stone, which fell at Shytal near Dacca, on the 11th August, the fall of which was announced at the last meeting.

4. From Prince Mohammad Jallaluddin, a specimen of a dead snake —*Bungarus Candidus*

5. From Colonel R. C. Tytler, a collection of zoological specimens.

6. From His Excellency the Viceroy, a stone Buddhist figure, with an inscription, from Sahet Mahet, the ancient Srávasti.

The President announced that a pension of £150 a year had been granted to the Society's Curator, Mr. E. Blyth, to take effect from the 1st January, 1863.

READ LETTERS.

From Colonel J. C. Haughton to the President, giving an account of a large collection of coins lately found at a place called Gosain Maree, about 14 miles S. S. W. from Cooch Behar.

From Captain Speke, acknowledging the vote of thanks of the Society, and announcing his proposed expedition to discover the source of the Congo.

From Captain H. H. Godwin Austen, giving an account of the discovery of some coins at Islamabad.

From R. H. Barnes, Esq., returning thanks to the Society for his election as a corresponding member.

A letter from Dr. G. Gordon, intimating his desire to withdraw from the Society, was recorded.

The following gentlemen, duly proposed at the last meeting were balloted for and elected ordinary members :—

Dr. J. McLelland ; W. P. Duff, Esq. ; Dr. Ferd. Stoliczka ; R. T. Martin, Esq. ; Major J. G. Gowan ; Baboo Modhoosoodun Doss, and H. D. Sandeman, Esq.

The following gentlemen were named for ballot as ordinary members at the next meeting :—

The Rev. M. D. C. Walters, Chaplain of Calcutta, proposed by Mr. Cowell and seconded by Mr. Grote.

A. G. Walker, Esq., proposed by Major Layard and seconded by Colonel Gastrell.

T. Dickens, Esq., Barrister-at-law, proposed by Mr. Blanford and seconded by Mr. H. C. Sutherland.

J. Forsyth, Esq., Bengal Staff Corps, proposed by Mr. R. A. Sterndale and seconded by Mr. Blanford.

The Rev. Mr. Corbyn introduced some aborigines of the Andaman Islands, and gave an interesting account of these people, with a short narrative of the circumstances which have led to the establishment of a friendly feeling between them and the settlers.

Thanks were unanimously voted to Mr. Corbyn for his interesting account of the Aborigines of the Andaman Islands.

After a few preliminary remarks on the ethnology of the Andamanese, Mr. Blanford stated that he was doubtful whether the intercourse opened will tend eventually to the civilization of the natives of the Andamans. He stated that the history of the New Zealanders and other barbarous people in Australia and America sufficiently warrants us to assume the broad fact that when two different races in very different states of civilization come in contact with one another, the more powerful race exterminates the less powerful, and that civilization, to be permanent, must be attained by gradual steps and mainly be developed from within, foreign influence being but a secondary agent.

Mr. Cowell could not concur in the opinion of Mr. Blanford ; on the contrary he believed that history generally bears out the fact that nations cannot rise in civilization without an influence *ab extra*. He quoted some instances from ancient history in support of this view.

The President remarked that without entering into the abstract question raised by Mr. Blanford, it might perhaps be doubted if the facts cited by him fully warranted in their entirety the conclusions at which he had arrived.

No doubt it was unfortunately true that in the majority of cases in which a race of high civilization had come into contact with another of a very inferior civilization, the result had been fatal to the latter. It was unnecessary here to discuss the causes which had contributed to produce this effect. The President, however, would call the attention of the meeting to one instance which he believed proved at least that an exception might exist to the general rule. The Laps whom Mr. Blanford had cited as forming a part of the same brachycephalic family to which the Andamanese belonged, had been for some time (for more at least than a century and a half) in contact on either side with Swedish and Russian civilization, and however it might be the fashion to decry the character of the latter, there could in reality be no doubt that it was civilization of the highest order, especially in that part of Russia which bordered on the territory of the Laps.

Now, the result had certainly not been in this case the extermination of the Laps; indeed, though not speaking on accurate information, the President believed that the Laps had neither diminished in numbers nor deteriorated in condition, since the commencement of the last century.

But whatever might be the opinion of the meeting on the merits of Mr. Blanford's general proposition, it was important to remember that in the present case the question was not whether or not we should leave the Andamanese alone, for the commencement of our intercourse with them was unavoidable. These islands lie in the very track of a very important and daily increasing line of commerce. They contain what are in reality the only harbours of refuge within the Bay of Bengal. It had been already constantly pressed upon Government that it was their duty for the protection of these our subjects, and those of other nations trading in these seas to reclaim these Islands now abandoned to a barbarous and hostile population. No doubt these considerations have sooner or later made interference inevitable. The establishment of a penal colony which the necessities of jail discipline in India had compelled Government to form, only hastened the event.

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It was beyond denial that the commencement of such an intercourse with this uncivilized race involved grave moral responsibilities, and these could not be approached without anxious consideration.

But the question was not now, whether this intercourse should be commenced at all, but by what means and in what manner it could be most humanely and successfully commenced.

So far as they had gone, Mr. Corbyn's endeavours had been unusually happy, and promised most favorably for the future. No doubt further efforts would be made in the same direction, and it was to be hoped with the same prosperous result. It might indeed be otherwise, but at any rate it was the duty of the more civilized race to omit no effort to avoid the evils which had hitherto resulted from its contact with those of the lower grades of civilization, and the meeting would doubtless consider that Mr. Corbyn was entitled to all praise for the patience, tact, and humanity which had hitherto distinguished his efforts to reclaim and civilize the Andamanese.

Communications were received—

1. From Rev. I. Loewenthal, a paper on some Persian inscriptions found in Srinagar, Kashmir.

2. From Baboo Gopinath Sen, Abstract of the hourly Meteorological Observations, taken at the Surveyor General's office, for the month of August last.

3. From W. Theobald, Esq., Jr. a paper on the variation of some Indian and Burmese Helicidæ, with an attempt at their re-arrangement, together with description of new Burmese Gasteropoda.

4. From Professor J. Dowson, through E. Thomas, Esq., remarks on Major General Cunningham's paper on the *Taxila* inscription.

Mr. Cowell read some extracts from a paper by Colonel Abbott on the site of Aornos.

Mr. Cowell, having read extracts from the paper, Major Walker made some comments on the subject of it, and stated that so far as he was aware of the merits of the question he would adopt the position as given by Mr. Loewenthal in opposition to Colonel Abbott's arguments.

In consequence of the lateness of the hour the paper of Mr. Loewenthal on some Persian inscriptions was not read, and the meeting separated.

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For December, 1863.

The monthly general meeting of the Society was held on the 2nd instant.

A. Grote, Esq., in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From the Assistant Secretary to the Government of India, Foreign Department—a copy of a report by R. H. Davies, Esq., on the trade of Central Asia.

2. From Baboo Ganendra Mohun Tagore, Professor of Hindoo Law in University College, London—a pamphlet containing the substance of a lecture delivered by him before the Ethnological Society of London, "On the formation and institution of the caste system—the Aryan polity."

3. From Baboo Prosonno Coomar Tagore—a copy of his English translation of *Vivádа Chintámani* from the original Sanskrit of Váchaspati Misra.

4. From his Highness the Mahárajah of Burdwan—a copy of the *Ádi* and the *Sabhá parvas* of the Mahábhárata in Sanskrit, with a Bengali translation, published under his auspices.

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members:—The Rev. M. D. C. Walters; A. G. Walker, Esq.; J. Forsyth, Esq.; and T. Dickens, Esq.

W. Murray, Esq., B. C. S. was then proposed by Mr. Cowell for ballot as ordinary member at the next meeting, seconded by Mr. Blanford.

The Secretary read the following report, which had been adopted by the Council, on a proposition submitted by Mr. C. Horne for facilitating a more extended correspondence on Natural History subjects:—

"The practicability of carrying out Mr. Horne's proposition depends mainly on the assistance afforded by those interested in its accomplishment, the Council being unanimously of opinion that a published list of naturalists, numismatists, and others would be of great assistance to those engaged in these studies, and it is believed that such a list would facilitate the exchange of duplicate specimens, and at the same time enable those interested in special subjects to know in what quarter to apply for information and assistance.

"Much help for the formation of such lists may be afforded by members of the Society, and it is therefore recommended that, as a preliminary step, a circular with a blank form be forwarded to members of the Society, requesting them to insert the names and addresses of those collectors with whom they may be acquainted, and to specify the subjects wherein they are respectively interested; at the same time members should be requested to state whether they wish their own names to appear in the proposed list, and to furnish similar information with regard to themselves, as well as to mention any specimens which they might wish to offer as exchanges.

"It would, in the next place, be necessary to apply directly to those gentlemen who, not being members of the Society, may be indicated by the latter as collectors, in order that their assent to the publication of their names, and perfectly authentic information respecting their requirements, &c., may be obtained; and they might be asked at the same time to communicate to the Society the names of others with whom they may be acquainted, and who may in like manner wish their names to be recorded. In all cases, however, no name or details should be published that are not furnished or mentioned by the individuals themselves.

"The materials thus obtained should be classified in a manner hereafter to be determined upon, and the lists so formed, printed on fly-sheets for insertion at the end of each number of the *Journal*. It might be found desirable also to append authentic information as to those who may be engaged in the working out of any special subject with a view to publication."

The Chairman, on the part of the Council, recommended that the reference of Capt Lees' amendment of Rule 77 to the Society at large be for the present deferred. This recommendation was made in consequence of the Council's having just appointed a committee to revise the rules generally. It seemed expedient to include in one reference other amendments of the rules which might result from this revision.

Communications were received—

1. From Baboo Gopinath Sen—an abstract of the hourly meteorological observations taken at the Surveyor General's office in September last.

2. From Major J. T. Walker, Superintendent G. T. Survey—report of the operations of the G. T. Survey of India during 1862-63.

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Mr. Oldham was then invited to read his paper submitted in October, entitled "Notes on the Fossils in the Society's Collection reputed to be from Spiti;" and that gentleman, after objecting to the postponement of the paper, proceeded to read it.

The Chairman remarked on the objections raised by Mr. Oldham, that his paper, though announced at the October meeting, had not been read on account of Mr. Oldham's absence from that and the following meeting.

An interesting discussion ensued between Mr. Oldham and Mr. Blanford as to the identity or otherwise of these fossils with those of the Gerard collection.

Mr. Oldham then exhibited to the Society a small collection of stone implements which had very recently been discovered by Messrs. King and Foote of the Geological Survey of India, near Madras. These were all of the ruder forms, so well known as characterizing the flint implements which had excited so much attention within the last few years in Europe. They were all formed of dense semi-vitreous quartzite—a rock which occurred in immense abundance in districts close to where these implements had been found, and which formed a very good substitute for the flints of north Europe. This was the first instance in which, so far as he knew, such stone implements had been found in India *in situ*. True celts of a totally different type and much higher finish, and in every respect identical with those found in Scotland and Ireland, had been met with in large numbers in Central India, but never actually imbedded in any deposits. They were invariably found under holy trees, or in sacred places, and were objects of reverence and worship to the people, who could give no information as to the source from which they had been originally gathered together. A single and very doubtful fragment of a stone implement had been found by Mr. W. Theobald, Junior, in examining the deposits of the Gangetic plains near the Soane river. This occurred in the Kunkurry clay of that district; but, with this exception, he was not aware of any stone implements, of any kind, having previously been noticed *in situ* anywhere in India Those now on the table had been collected partly by himself, from a ferruginous lateritic gravel bed, which extended irregularly over a very large area west of Madras. In places this was at least fifteen feet below the surface, cut through by streams, and in one such place from which

some of the specimens on the table were procured, there stood an old ruined pagoda on the surface, evidencing that, at least at the time of its construction, that surface was a permanent one. This bed of gravel was in many places exposed on the surface and had been partially denuded; and it was in such localities where these implements had been washed out of the bed and lay strewed on the surface that they were found most plentifully.

Mr. Oldham remarked on the great interest attaching to such a discovery, and on the probable age of the deposit in which they occurred. Another point of interest connected with the history of such implements was the remarkable fact that, while scattered in abundance over the districts where they occurred, were noble remains of what would by many be called Druidical character-circles of large standing stones, cromlechs, kistvaens, often of large size and well preserved, all of which were traditionally referred to the Karumbers, a race of which there still existed traces in the hills; still all the weapons and implements of every kind found in these stone structures were invariably of iron. No information whatever regarding these stone implements could be obtained from the peasantry, who had been quite unaware of their existence.

Thanks were unanimously accorded to Mr. Oldham for his interesting remarks on the stone implements.

For January, 1864.

The annual general meeting of the Asiatic Society was held on the 13th instant.

E. C. Bayley, Esq., President, in the chair.

The Secretary read the following Annual Report for 1863:—

ANNUAL REPORT.

The Council of the Asiatic Society have much satisfaction in announcing that the marked prosperity of the Society during the past year has been fully equal to that of the previous years, indicating an ever-increasing interest in the objects of the Society on the part of the public, which augurs well for the future progress of Indian science.

It is, however, with feelings of deep regret that the Council have to record the decease of the Society's patron, the Right Hon'ble the Earl of Elgin and Kincardine, whose cordial sympathy with the

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objects of the Society has been manifested on all occasions when the support or concurrence of the Government has been solicited by the Society.

During the past year the Society has received an accession of fifty-nine ordinary and two corresponding members, making a total of sixty-one. The loss by death (three) and retirement (twelve) has not exceeded fifteen members; so that the Council is enabled to congratulate the Society on a net increase of forty-four members, making an actual total of 355,* against 311 of the preceding year.

Baboo Sumbhoo Chunder Roy, Maharaja Narendra Narain Bhupa, and Dr. J. Browne are the names of the deceased members.

FINANCE.

The amount received by way of contributions from members was Rs. 8,930-2-9, which is in excess of the collection of the previous year. Of this sum Rs. 1,792 were for admission fees, and the balance, Rs. 7,138-2-9, for quarterly subscriptions.

Annexed is a table showing the average collection of the previous ten years. The resulting sum does not exceed the collection of the year under review.

	Rs.	*As.*	*P.*
1853, ...	7,778	9	3
1854, ...	7,082	0	0
1855, ...	7,166	0	0
1856, ...	8,096	0	0
1857, ...	7,068	0	0
1858, ...	6,923	8	0
1859, ...	6,750	0	0
1860, ...	6,441	0	0
1861, ...	6,812	0	0
1862, ...	7,222	9	0
Total Rs., ...	71,339	10	3

* Resident Members, ... 129
Non-resident, ... 147
Absent, ... 79
Total, ... 355

The average being Rs. 7,133-15-5 per year.

The details of the accounts have been referred to auditors, and will be laid before the next monthly meeting.*

The probable income and expenditure of the Society for the next twelve months may be estimated as follows :—

Income.

Contributions,	Rs.	8000
Admission Fees,		1800
Journal,		600
Library,		400
Museum,		6000
Secretary's Office,		10
Coin Fund,		50
Total,		16,860

Expenses.

Journal,	Rs.	3,200
Library,		2,400
Museum,		7,200
Secy.'s Office,		1,900
Building,		500
Coin Fund,		150
Miscellaneous,		350
Total,		15,700

LIBRARY.

During the past year the library has received large additions, both by presentation and purchase.

In the Natural History Department, the most important additions have been Mr. Gould's large works on the Birds of Asia, purchased in England, and 30 vols. of the *Transactions of Leopoldino-Caroline Academy* (which completes the Society's set of that most valuable series up to the year 1851) from the late Dr. Walker's library.

In the Philological Department the *Codex Sinaiticus*, edited by Professor Tischendorf and presented by the Imperial Russian government, is the most note-worthy acquisition.

* Having been submitted to the March meeting and adopted, they are printed in the usual place at the end of the proceedings of the Annual General Meeting. Ed.

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The total number of volumes, pamphlets, and periodicals added to the library during the year is 572.

With a view to the further improvement of the library, the Council have requested the Library Committee to enquire into, and especially report upon, its present condition, and to submit propositions for its future arrangement; so that future additions may be made systematically as the funds of the Society may permit, and in accordance with the demands of science. Special attention will be given to the completion of those serials or other works, deficient sets of which now exist in the library.

COINS.

The collection of these valuable relics has not received any accession of moment. The only addition deserving of mention is from Baboo Shibchunder Mullick, who presented a trove of silver Mahomedan coins from his zemindary in the Sunderbuns.

MUSEUM.

Owing to the severe illness of the Society's late curator, Mr. Blyth, which compelled that gentleman to proceed to England at the close of 1862, the museum has been deprived of the supervision of a professional curator during the whole of the year.

Dr. Jerdon has, however, most kindly given much time and attention to the collections while engaged in the preparation of his *Manual on the Natural History of India*, and Baboo Poorno Chunder Bysack having had charge of the collections mainly with a view to their preservation, the Council are enabled to report that the collections have been well cared for, and that recent additions have been mounted and arranged so as to be equally available with the former for study or inspection.

The collection of fossil remains of invertebrate animals and plants has been mounted, worked out, arranged, and catalogued, and the collections of birds' eggs remounted and arranged in a cabinet especially provided for that purpose.

The valuable series of stuffed quadrumana which had been hitherto exposed in one of the lower rooms, has been arranged in two large glass cases, and it is trusted that they have been placed beyond danger of future deterioration. A new case has been provided for the Society's models and specimens of meteorites, and insect cabinets have been ordered from England at a cost of Rs. 500; a cabinet of slide

drawers for the reception of duplicates and specimens under examination has also been provided.

The Society's collection of Indian meteorites was transmitted to Professor Maskelyne in 1862, that gentleman having most kindly undertaken the charge of their chemical investigation and of their section with a view to the exchange of portions of them with the British Museum. The Society have now received from Professor Maskelyne a very beautifully-executed series of models of the original stones and portions of the stones themselves, together with a series of specimens of foreign meteorites presented by the Trustees of the British Museum.

They have also received, through the kindness of Dr. Haidinger, another valuable series from Dr. Hornes, Director of the Imperial Mineral Cabinet of Vienna, to which a set of Indian specimens had been presented by the Society.

In the Zoological Department the Society have received a set of upwards of 300 species of invertebrate fossils from Mr. H. F. Blanford, and numerous specimens of the mammals and birds of the Andaman Islands, with two almost entire skeletons of the natives of those islands, from Lieutenant-Colonel Tytler.

Captain Smyth has also presented several skins of Thibetan animals;—these last, together with some skeletons of those animals that had been purchased by the Society and since mounted, form valuable representatives of the zoology of Thibet and Northern India.

In the Ethnological Department the collection of crania has received but few additions, but a considerable number of portraits of ethnological interest have been added to their photographic albums, chiefly from the Government of India.

The archæological collection has received a slightly mutilated colossal figure of Buddha exhumed by General Cunningham at Sahet Mahet, the ancient Srávasti in Oudh, presented by the Right Hon'ble the late Earl of Elgin. Its basement bears an important inscription, in which the name Srávasti, of the place where it was found also occurs.

The Council are glad to be able to announce that the preliminary negotiations for the transfer of the Society's Museum to Government have now assumed a shape which permits of their being submitted to the Society at large, with a view to definite action.

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The number of visitors to the Society's Museum has not diminished during the past year, amounting in average to 291 visitors per diem.

Natives.

Male,	96,629
Female,	5,924

Europeans.

Male,	2,545
Female,	1,384
Total,	106,482

OFFICERS.

The Council have great pleasure in announcing that the home authorities have at last consented to grant a retiring pension of £150 per annum to their late Curator, Mr. Blyth. Mr. Blyth has for more than twenty years laboured most zealously in the cause of natural science in India; and it must be a cause of congratulation to the Society that his services have at length received this well-earned acknowledgement from the Home Government. He has been absent on sick leave in Europe during the whole of the past year.

The arrangements which have been sanctioned by the Council in consequence of his absence, will be submitted at a future meeting.

Baboo Poorno Chunder Bysack has officiated as assistant-curator since the last annual meeting.

The Librarian and Assistant-Secretary continues to discharge his duties to the entire satisfaction of the Council.

JOURNAL.

Five numbers of the *Journal* (including a suppiementary number) have been published during the year; several valuable papers on Natural History and Archæology have been contributed, and the supplementary number possesses great interest as containing General Cunningham's Report of his Archæological Survey in 1861-62.

BIBLIOTHECA INDICA.

Seventeen numbers of the *Bibliotheca Indica* have appeared during the past year, *viz.*—eight of the new series, and nine of the old.

In the new series, Pundit Prema Chandra Tarkabagish has completed his edition of the *Kávyádars'a* of S'ri Daṇḍin, with his original

commentary, and Mr. Cowell has published the second part of the *Maitri Upanishad.*

Two new works have been also commenced of considerable interest, in two different departments of Oriental literature—the *Tabakát-i-Nasiri* in our series of Muhammadan historians, and the *Púrva Mímánsa Sutras.*

The former is the chief authority of the early Muhammadan history of India, and is especially valuable for the *Bibliotheca*, as we had already published the history of Ziá-i Barní, which was expressly designed as its continuation. The latter takes up a branch of Hindoo philosophy which had hitherto been comparatively neglected; and the present publication will render the *Sutras* of Jaimini, and the rare commentary of Sabara, available to European research. The Council hope ere long to be able to announce an edition of the *Yoga Sutras;* the only one of the six philosophical systems of the Hindoos remaining unpublished.

In the old series we have to announce the completion of the edition of the *Vedánta Sutras* with the commentary of Sankara Áchárya and the gloss of Govinda Ánanda, originally commenced by Dr. Roer, and subsequently continued by Pundit Ráma Náráyana Vidyáratna.

Baboo Rájendralál Mitra has issued two numbers of the *Taittiríya Bráhmana*, and Mr. Cowell two numbers of the *Taittiríya Sanhitá.*

The titles of the fasciculi of the new series are:—

1. The *Kávyádars'a* of S'ri Dandin, edited by Pundit Prema Chandra Tarkabágís'a, Nos. 38, 39, 41, Fasc. III. IV. V.

2. *The Maitri Upanishad,* edited by Mr. E. B. Cowell, M. A., No. 40, Fasc. II.

3. The *Tabakát-i-Nasiri* by Minhajuddin Juzjani, edited by Captain W. N. Lees, LL. D. Nos. 42, 43, 45, Fasc. I., II., III.

4. The *Púrva Mímánsa Sutras* of Jaimini, edited by Pundit Mohesh-chunder Nyáyaratna, No. 44, Fasc. I.

The titles of the fasciculi of the old series published during the year, are—

1. The *Vedánta Sutras*, edited by Pundit Ráma Náráyana Vidyáratna, Nos. 195, 198, 199, 200, 201, Fasc. IX., X., XI., XII., XIII.

2. The *Taittiríya Bráhmana*, edited by Baboo Rájendralál Mitra, Nos. 196, 197, Fasc. XVII and XVIII.

3. The *Taittiríya Sanhitá*, edited by Mr. E. B. Cowell, M. A., Nos. 202, 203, Fasc. XVIII. and XIX.

The Report having been read, it was proposed by Colonel Thuillier, seconded by Mr. Grote, that it be adopted. The proposition being put to the vote was carried unanimously.

The meeting then proceeded to ballot for the Council and officers for the next year.

Colonel Thuillier and Mr. W. L. Heeley were appointed scrutineers, and at the close of the ballot the chairman announced the following result:—

Council—E. C. Bayley, Esq., President; Captain W. N. Lees, Dr. T. Anderson, Baboo Rajendralal Mitra, Vice-Presidents; Dr. J. Fayrer; E. B. Cowell, Esq.; Dr. S. B. Partridge; J. Obbard, Esq.; Lieut.-Col. C. H. Dickens; Lieut.-Col. J. E. Gastrell; Lieut.-Col. H. Hyde; H. Leonard, Esq.; Baboo Jadava Krishna Sing;—H. F. Blanford, Esq., and W. L. Heeley, Esq., Joint Secretaries.

The meeting then resolved itself into an ordinary general meeting.

The following presentations were announced—

1. From Col. Fytche, Commissioner, Tenasserim Division, British Burmah,—heads and horns of a male and a female double-horned rhinoceros, from the source of the Tenasserim river.

2. From Baboo Rajendra Mullick,—a dead hybrid goat, and a kangaroo.

3. From Baboo Shoshee Chunder Dutt,—a copy of his work entitled *Stray Leaves, or Essays, Poems, and Tales.*

4. From the Bombay Government,—a copy of a Sindi work entitled *Saswi and Punhu.*

5. From Captain F. Stubbs,—a number of coins collected at different times, in the Punjab and Delhi.

A vote of thanks to the above donors was proposed by the President, and carried unanimously.

Letters from Lieut.-Col. L. Pelly, Lieut. W. J. Stewart, Rev. J. C. Thompson, E. G. Glazier, Esq., and Saheb Zada Mohammad Walagohur, intimating their desire to withdraw from the Society, were recorded.

W. Murray, Esq., proposed at the last meeting was balloted for and elected an ordinary member.

The following gentlemen were named for ballot as ordinary members at the next meeting:—

Hon'ble Sumbhoo Nauth Pundit, Judge of the High Court, Calcutta, proposed by Mr. Cowell, seconded by the President.

Baboo Kaliprosunno Dutt, Pleader High Court, proposed by Baboo Rajendralal Mitra, seconded by Mr. Grote.

H. Leeds, Esq., Conservator of Forests in Burmah, proposed by Mr. Theobald, seconded by Mr. Grote.

A. M. Verchere, Esq., H. M.'s Indian Army, proposed by Capt. H. H. G. Austen, seconded by Capt. Lees.

Lieut. A. Pullan, Topographical Assistant G. T. Survey, Kashmir Series, proposed by Capt. H. H. G. Austen, seconded by Mr. Grote.

The Council reported that the following correspondence had passed between them and the Government of India, on the subject of the transfer of the Society's Museum to Government.

No. 173.

FROM THE SECRETARY TO THE ASIATIC SOCIETY OF BENGAL,—TO E. C. BAYLEY, ESQ., SECY. GOVT. OF INDIA, HOME DEPT.

Asiatic Society's Rooms, Calcutta, 13th April, 1863.

SIR,—With reference to former correspondence on the subject of the proposed new museum, I am directed by the Council of the Asiatic Society to solicit the attention of Government to the plan sketched out in my letter dated 18th June, 1862, No. 180, as the basis of a definite arrangement for the transfer of the Society's museum.

As some years must probably elapse before a new museum building can be erected and fitted for the reception of the Society's collections, during which time the zoological portion of the collections will be liable to continued deterioration, if adequate provision be not made for their preservation, it appears highly desirable to the Society's Council that arrangements should be speedily completed for the permanent curatorship of the museum.

It is the more advisable that the consideration of this question be no longer deferred, as the Society's curator, Mr. Blyth, has now left India in such a state of health that there appears but little probability of his returning to resume his former duties, and the valuable services now voluntarily given by Dr. Jerdon to the superintendence of the zoological portion of the museum, are necessarily temporary, and not to be permanently relied on. It will, consequently, be necessary before long to consider the appointment of a permanent successor to Mr. Blyth, and it is obviously desirable that the whole question

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of the future management of the museum should be decided before new engagements are entered into.

The Council are of opinion that it is by no means necessary to wait for the transfer of the collections to the new museum building in order to give effect to that portion of the proposed arrangement which relates to the internal management of the museum. With a proper staff of curators and assistants, the museum may be retained for some time to come in the present building, and with some increase of available funds, the present collections and such additions as may be expected in the interval, may be kept in a state of good preservation, and be made available for the purposes of science, even though they cannot be entirely displayed to casual visitors.

I am accordingly directed to solicit that the Government will take into early consideration the propositions of the Council communicated in my former letter,* with a view to determining the conditions on which the proposed transfer of the Society's museum may be finally agreed to.

* No. 180, dated 18th June, 1862.

I have, &c.

(Sd.) W. S. ATKINSON,
Secy. Asiatic Society.

No. 5503.

From E. C. BAYLEY, ESQ., *Secy. to the Govt. of India, To* W. S. ATKINSON, ESQ., *Secy. Asiatic Society of Bengal.*

Dated Fort William, the 1st Sept., 1863.

Home Department.

SIR,—With reference to your letters of the 13th April last, and 18th June, 1862, I am desired to state that his Honor the President in Council is not unwilling to enter at once upon the consideration of the arrangements suggested in the last named letter, instead of postponing it until the Government may be in a position to erect a fitting building to contain a Government Museum.

2. But before doing so, the President in Council desires to offer some observations upon the rules suggested by the Council of the Society as the basis of a plan for the transfer of the Society's museum to Government, to be submitted for the approval of the Society at large.

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3. The rules to which these observations apply, are the second, fifth, tenth and thirteenth.

4. The second defines the number and mode of election of the governing body of the proposed Government museum, and would, as it is now worded, leave the nomination of the Vice-President and of one-half of the Council with the Society. I am directed to point out, that as the museum will hereafter be wholly public and supported at the expense of the State, it seems to be inconsistent with its character to reserve so large a share in its management to a private Society. The President in Council is, therefore, of opinion that no more than one-third, instead of one-half, of the trustees should be named by the Asiatic Society.

5. For the same reasons, the President in Council dissents from the fifth rule, which would secure separate and distinct privileges to members of the Asiatic Society. When the museum has become the property of the public, the public ought to enjoy as free a use of its contents as is consistent with their due preservation. It by no means necessarily follows that the terms on which this use is granted to the public should be more limited than those on which the members of the Asiatic Society now enjoy the use of their own collection, or that the privileges of the members should be in any way restricted by the transfer.

6. Similarly, the President in Council would suggest that the reservation as to the library and manuscripts contained in the tenth and thirteenth Rules, should be omitted. It seems almost unavoidable that the proposed museum should possess the adjunct of at least a library of reference, such as the library of the Society would, with some additions, form ; and there seems to be no good reason why two similar libraries should co-exist under the same roof. If the library and manuscripts were transferred with the other collections, it is not probable that the conditions attached to their use would be less liberal than those of the Asiatic Society, so that the members of that Society need not in any degree, as has been already said with respect to the other collections, suffer any abridgment of their privileges by the transfer.

I have, &c.

(Sd.) E. C. Bayley,

Secy. to the Govt. of India.

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No. 489.

From the Secretary to the Asiatic Society of Bengal,—To E. C. BAYLEY, ESQ., *Secretary, Government of India, Home Department.*

Asiatic Society's Rooms, Calcutta, 6th Nov., 1863.

SIR,—With reference to the previous correspondence noted in the margin, on the subject of the proposed transfer of the Society's museum to Government, I have the honor to submit to you the views held by the Council of the Society on those modifications of the Council's scheme proposed in your letter No. 5503 of the 1st September, 1863.

From the Govt. of India, Home Dept. No., 2564, dated 22nd May, 1862.
To the Govt. of India, in reply No. 180, dated 18th June, 1862.
To the Govt. of India, in continuation No. 173, dated 13th April, 1863.
From the Govt. of India, in reply No. 5503 dated 1st September, 1863.

Previous to doing so, I am desired to assure you that the Council have received with much pleasure the announcement that his Honour the President in Council is not unwilling to enter at once upon the consideration of the proposed transfer, feeling that the interest thus manifested by Government in the progress of natural science cannot but have a most beneficial influence upon its cultivation in this country.

Under these circumstances, I am desired to state that the Council are prepared to modify, in accordance with his Honour's views, the rules proposed in their late Secretary's letter, (dated June 18th) so far as may not, in their opinion, seriously impair the well-being of the Society which they represent. Thus, while their original proposal, that one-half of the trustees of the new museum should be nominated by the Society, was suggested by the probable preponderance of the Society's collections for many years to come in the new museum, as well as by the fact that the Society has on many occasions acted as the scientific advisers of Government, the Council feel confident that the interests of Science will be so cared for by Government in the selection of its nominees, that they may without hesitation defer to his Honour's views on the proposed revision of their second Rule.

With similar feelings and on similar grounds, the Council concur in his Honour's suggestion that the fifth Rule proposed by them be so modified that the public at large be admitted to the same free use of the museum as that now enjoyed by the members of the Society. Both, they understand, would be only subject to such restrictions as may be necessary for the due preservation of the collections.

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While, however, the Council are thus prepared to accede to his Honour's suggestions with regard to the management of the new museum, and to waive any claim of exclusive privilege for the members of the Society, they regret that the proposed modifications of Rules X. and XIII. are such as they cannot for a moment entertain. On this point there is entire unanimity on the part of the Council, and they feel sure that the same feeling pervades the Society at large. In fact, his Honour must on further consideration concur with them that the Society would, after such a transfer as that suggested, cease to exist. It would have no privileges to offer to its members, who would gradually leave an institution which had nothing but its traditions and its name to hold it together, and would in a few years have nothing but its house to yield it an income.

It appears, however, to the Council that the objects which the Government and the Society respectively have in view are not incompatible, and that the Society's library and the museum being under the same roof, while the library remains the property of the Society, it may equally be available to the curators or others working in the museum, as is at present the case; and thus that such funds as may be allotted by Government for the formation of a museum library may for some time to come be devoted to the purchase of such works as are not already possessed by the Society. I am, therefore, directed by the Council to propose the above modification of his Honour's suggestions, and to express their hope that this arrangement may be found to fulfil every desired end.

I have, &c.

(Sd.) H. F. BLANFORD,
Secy. Asiatic Society.

No. 7622.

From E. C. BAYLEY, ESQ., *Secy. to the Govt. of India, To* H. F. BLANFORD, ESQ., *Secy. to the Asiatic Society of Bengal.*

Dated Fort William, the 5th Dec., 1863.

Home Department.

SIR,—I am directed to acknowledge the receipt of your letter No. 489, dated the 6th ultimo, intimating that the Council of the Asiatic Society are prepared to accede to the suggestions offered to them with egard to the management of the new museum, and to waive any

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claim of exclusive privilege for the members of the Society; but that they cannot consent to transfer the Society's library to Government.

2. In reply I am directed to state that the Governor-General in Council has no wish to press upon the Society the proposed modifications of Rules X. and XIII., to which your letter expresses such strong objections, and that the alterations in Rules II. and V., which have been accepted by the Council, are considered by his Excellency in Council satisfactorily to have cleared the way to a definite conclusion of the negotiations pending between Government and the Society.

I have, &c.

(Sd.) E. C. Bayley,
Secy. to the Govt. of India.

After the correspondence had been read by the Secretary, it was proposed by Dr. Oldham, seconded by Mr. Atkinson, and carried—

"That the present meeting desire to impress on the Society at large the propriety of authorising the Council of the Society to enter into definite and conclusive arrangements with the Government of India relative to the transfer of the Society's museum, in accordance with the terms of the correspondence now read.

"That the Council be requested to forward a copy of the whole correspondence to the members of the Society at large, and that the ordinary meeting in March be made special for the purpose of deciding this matter, in accordance with No. 43 of the Bye-laws."

The Secretary read the following letter from Captain Ralph Ouseley to the address of the President, on some ancient localities in the Fyzabad district:—

"I am at work near the ruins of an old town named Uldemow. Tradition says it belonged to the "*Bhurs*," and was destroyed many hundreds of years ago. I went a few days ago to see the ruins of what is supposed to have been a fort, and also the remains of an old temple. The town was situated on the banks of the Goomtee about twenty miles below Sultanpore, and opposite the fort; there is a masonry dam below the water right across the river;—the natives declare that it is neither more nor less than the roof of a tunnel which runs below the river bed. If I go there again I intend to make farther enquiries on this point. I ascertained in conversation with some of my native friends that coins are very often picked up

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about the ruins, and I managed, through the influence of a very learned Pundit here resident, to obtain a few, and I am sending you by registered letter dâk to-day four; one silver modern one which does not belong to these parts, but which some one had by him. It is said to be a Bhootan coin, coined in the present King of Nepal's reign. The other three coins are copper—one, a Mahomedan one, bears the date 1021, supposed to be Hegira, and therefore about 260 years old. The other two neither Hindoos nor Mahomedans can read. The most learned pundits are at fault, but say that the characters are like Chinese, and so they appear to me. If these coins prove any addition to your collection, I will try and get some more."

The following extract from a letter from Baboo Rungolal Banerjea was also read:—

"I have also seen a copper-plate inscribed on both sides and bearing the record of a grant of land by Rajah Purusottama Deo of Orissa. It is now in the possession of an old man of eighty years, the Bhuñiya of *Goapadha*. He values it very highly, and cannot be prevailed upon to part with it. I have, however, managed to get a transcript, which I enclose. You will perceive from it that, though an Ooria document, it was executed in Bengal, a part of which was at one time held in sovereignty by the Kings of Orissa. The donor, Purusottama Deo of the Surajvansa dynasty, who, according to Stirling, reigned from 1478 to 1503, A. D., died in Bengal on the banks of the Bhagirutee, probably near Triveni, where the grant was made on the occasion of an eclipse. The record names the Ganges *(Gunga Garbha)* but, of course, it means the Hooghly, for you know that was the old bed of the Ganges; and what is now called by that name by Englishmen has no sanctity, and owes its present volume to a shifting of the ever-changing river. The date of the document is Monday, the 10th of *Baisakha* in the year 25 of the Rajah's reign, which will be equal to 1501, or a little before his death. The Rajah was a great patron of Chaitanya Deva, whose religion he adopted; and it was probably to visit the birth-place of that reformer that he came to Bengal; for there is no mention anywhere of his ever having entered the country as a conqueror, although Stirling gives a long account of his military successes in Conjeveram. His calling himself "Lord of Gauḍa" I take to be of no better import than the name of France in the BR. FR. *et* HIB. REX of the coins of Queen Anne and the first

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two Georges. The *Nava Koti* (nine forts) alluded to in the record refers to some of the baronial castles of the Tributary Mehals, but I cannot ascertain which of them.

"The subject of the grant was the village of Purusottomapura, in the district of Balasore, close to Bastah. It was at the time of gift largely inhabited by Brahmins; hence the distinctive title of *Sásana Bhumi*. The donee was a Brahmin of the name of Poteswara Bhatta, whose descendants still own it, though they are no longer Brahmins. During the supremacy of the Pathans two brothers quarrelled about their patrimony, and to secure the good graces of the Moslem Governor, one of them embraced the religion of the Koran, to which his descendants still adhere. The ladies of the family, however, notwithstanding their nominal allegiance to Mahomed, continue Brahminical in their habits and mode of life, and the household gods and the fire altar may still be seen in the family homestead. The plate, which is in a good state of preservation, is shaped like a *Kangura*, and has the deed of gift inscribed on one side, and the imprecatory verses on the other.

OBVERSE.

ଶ୍ରୀ ଜୟଦୁର୍ଗାୟୈନମଃ । ୱାର ଶ୍ରୀଗଜପତି ଗୌଡେଶ୍ୱର ନବକୋଟି କର୍ଣାଟେଶ୍ୱର ବର୍ଗେଶ୍ୱର ଶ୍ରୀପୁରୁଷୋତ୍ତମଦେବ ମହାରାଜାଙ୍କର ପୋତେଶ୍ୱର ଈଶ୍ୱରକୁ ଦାନ ଶାସନ ପଟା ୭୫ ଅଙ୍କ ମେଷର ୧୦ ଉ୍ଂ ସୋମବାର ଗ୍ରହଣ-କାଳେ ଗଙ୍ଗାଗର୍ଭେ ପୁରୁଷୋତ୍ତମପୁର ଶାସନଭୂମି ଯାବଚ୍ଚନ୍ଦ୍ରାର୍କେ ପୁତ୍ର ପୌତ୍ରାଦ ପୁରୁଷାନୁକ୍ରମେ ଭୋଗ କରୁଥିବ ଜଳାରମ୍ଭ ନକ୍ଷେପ ସହିତ ଭୂମି ଦେଲୁ ॥

REVERSE.

ଯାବଚ୍ଚନ୍ଦ୍ରଶ୍ଚ ସୂର୍ଯଶ୍ଚ ଯାବଚ୍ଚଷ୍ଠତ୍ତେଦନୀ ।
ଯାବଦ୍ଧତ୍ତାମ୍ବୁଦ୍ୟେଷାଲସ୍ୟ ଯୁକ୍ତାବସୁନ୍ଧର ॥
ସ୍ୱଦତ୍ତାଂପରଦତ୍ତାଂ ବା ବ୍ରାହ୍ମବୃତ୍ତିଂ ହରେତ୍ଯଃ ।
ଷଷ୍ଟିବର୍ଷସହସ୍ରାଲଦଷ୍ଠାୟୁଂ ଜାୟତେକୃମିଃ ॥
ଶ୍ରୀମଦନଗୋପାଲଃ ଶରଣଂ ମମଃ ॥

TRANSLATION OF THE INSCRIPTION.

"Salutation to the auspicious Jayadurga. This is a deed* of gift of the great hero, the fortunate Lord of Elephants (Gajapati) the

* The word *patta* is used in the text, but a *pottah* is never granted for rent-free land, and the word therefore must be taken here for simply a 'deed.'

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Lord of Gauḍa, Navakoti, Karnáta, and Utkala, the auspicious Mahárájá Purusottama Deva to Poteswara Bhatta—

"On Monday, the 10th of Aries *(Baisákha)* in the year 25 *U** on the occasion of an eclipse, I, while in the bed of the river Ganges, do present to you the Brahmin-inhabited village of Purusottamapura with all its appurtenances, waters, gardens, and fields, that you and your heirs may enjoy the same as long as the sun and moon will last.

"As long as the sun and moon will run their course, and as long as the earth shall last, for even so long may the gift of mine of fruitful land last (with you). Whoever robs a Brahmin of his land, whether the same be his gift or that of others, shall be born a maggot in ordure for the period of 60,000 years. Sri Madanagopala Sarmana.† My marks, "figures of a conch, a dagger and a sword."

Communications were received—

1. From the Assistant Secretary to the Government of Bengal, copy of a report from the Executive Engineer of the Tirhoot division, on the subject of the saline matter which pervades the surface soil of that district.

2. From Lieutenant-Colonel J. Abbott, a letter containing a description of the elephant statues recently exhumed at the Delhi palace.

3. From Dr. F. E. Hall, a letter containing a reply to the remarks made by Baboo Rajendralal Mitra on an article published by him in the Society's *Journal* for 1861 entitled, "The Inscription of Erikaine now Eran, re-deciphered and re-translated."

4. From Baboo Gopinauth Sen, abstract of the hourly meteorological observations taken at the Surveyor General's office in October last.

5. From Baboo Rajendralal Mitra, "On the ruins of Buddha Gya."

The Baboo read the above paper, and the thanks of the meeting were voted to him on the motion of the President.

6. From the Military Secretary to his Excellency the Governor-General, a note on the *Didunculus Strigirostris* with photograph, being an extract from a New South Wales paper.

7. From the President, a note on a coin of the new Bactrian King Theophilos.

* The letter *U* evidently stands for Utkala, and the question is, was there ever an Utkala era?

† The word in the original is clearly *Saranam*, but I take it to be a misscript, for it is not at all likely that the donor should think of invoking the god Madanagopála at the end of the document. The place is where the minister of Mohapatra should sign; and I take the name to be of such an officer

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ABSTRACT STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

OF THE

ASIATIC SOCIETY,

FOR

THE YEAR 1863.

STATEMENT

Abstract of the Cash Account

RECEIPTS.

	1863.			1862.		
Admission Fees.						
Received from New Members, Rs.	1,792	0	0			
			1,792	0	0	1,600	0	0
Contributions.						
Received from Members, ...	7,138	2	9			
			7,138	2	9	7,222	9	0
Journal.						
Sale proceeds of, and subscriptions to the Journal of the Asiatic Society, ...	605	1	0			
Refund of Postage Stamps, ...	5	14	0			
Discount on ditto, ...	0	6	3			
			611	5	3	537	3	0
Library.						
Sale proceeds of Books, ...	365	12	0			
Refund of Freight, ...	23	0	0			
			388	12	0	521	0	0
Museum.						
Received from the General Treasury, ...	6,000	0	0			
Savings of Salary, ...	31	12	6			
			6,031	12	6	5,211	2	3
Secretary's Office.						
Sale of Postage Stamps, ...	6	12	0			
Discount on ditto, ...	1	12	9			
Fine, ...	0	8	0			
Refund of Postage, ...	1	11	0			
			10	11	9	6	3	0
Vested Fund.						
Sale proceeds of Government Securities, ...	5,000	0	0			
Interest on ditto, ...	134	1	8			
Premium on the sale of ditto, ...	360	0	0			
			5,494	1	8	245	0	0
Messrs. Williams and Norgate.						
Received from them, as per order in favor of Mr. E. Blyth on account of his salary, as per their letter, dated 9th July, 1863, ...	900	0	0			
Ditto ditto as per ditto, dated 26th Sept. 1863, ...	325	0	0			
			1,225	0	0			
Carried over,...			22,691	13	11			

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No. 1.

of the Asiatic Society, for 1863.

DISBURSEMENTS.

	1863.				1862.		
Journal.							
Printing Charges, including paper,	3,072	11	0				
Freight,...	152	4	0				
Purchasing Postage Stamps, ...	55	3	6				
Packing Charges, ...	25	8	0				
Charges for preparing Lithographs, ...	173	0	0				
Charges for Engraving and Printing of Plates, ...	83	8	0				
A Blank Record Book, ...	3	8	0				
Commission on the Sale of Books,	13	3	10				
Purchase of a Copy of Journal, No. III. of 1862, ...	2	0	0				
Preparing a Photograph, ...	15	0	0				
Petty Charges, ...	1	1	0				
				3,596	15	4	3,128 15 0
Library.							
Salary of the Librarian, ...	770	0	0				
Establishment, ...	84	0	0				
Purchase of Books, ...	312	0	0				
Book-Binding, ...	262	12	0				
Books Cleaning, ...	42	0	0				
Commission on Sale of Books, ...	39	8	11				
Printing Charges, ...	31	0	0				
Paid for a Teakwood Book Case,...	246	0	0				
Banghy Expenses, ...	1	8	0				
Landing Charges, ...	5	8	0				
Purchased 44 Stone Bottoms for the Book Cases, ...	22	0	0				
Paid Ticket writer for Labelling Photographic Album Books, ...	27	5	4				
Petty Charges, ...	14	4	3				
				1,857	14	6	2,698 1 3
Museum.							
Salary of the Curator, E. Blyth, Esq. at Rs 250 per month, for 12 months, from Dec. 1862 to Nov. 1863, ...	3,000	0	0				
His House-rent for half month, in Dec 1862, ...	40	0	0				
Paid Income Tax on Mr. Blyth's Salary, ...	107	8	0				
Carried over,... ...				5,454	13	10	

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RECEIPTS.

Brought over,...Rs.							22,691	13	11	
DEPOSIT.										
Lt. J. Johnstone, ...	...	...	18	0	0					
Capt. J. P. Basevi, ...	...	...	18	0	0					
E. G. Glazier, Esq.,...	...	...	18	0	0					
Quazee Abdool Quodoos,	...	...	5	10	0					
V. Irwin, Esq., ...	...	...	18	0	0					
Dr. Bhau Dajee, ...	...	...	42	0	0					
Babu Nobin Chunder Roy,	...	...	4	11	0					
Major J. T. Walker,	...	...	24	0	0					
F. Fedden, Esq., ...	...	...	22	0	0					
R. A. Sterndale, Esq.,	...	...	12	0	0					
A. E. Russell, Esq.,...	...	...	4	0	0					
J. Stephenson, Esq.,	...	...	36	0	0					
Lt.-Col. A. Phayre, ...	...	...	88	0	0					
Babu Brojendra Gopal Pal Chowdry, ...		...	2	3	0					
E. Blyth, Esq., ...	...	...	675	0	0					
W. T. Dodsworth, Esq.,	...	...	6	0	0					
T. H. Thornton, Esq.,	...	...	16	0	0					
C. Campbell, Esq., ...	...	...	6	0	0					
T. B. Lane, Esq., ...	...	...	36	0	0					
Baboo Munphool Pundit,	...	...	8	0	0					
Capt. Raverty, ...	...	...	7	4	0					
Capt. F. B. Norman,...	...	...	4	0	0					
Major J. J. M. Innes,	...	...	12	0	0					
							1,082	12	0	221 8 6
MISCELLANEOUS.										
Refund of the amount paid to Mr. A. M. Cameron through Major J. T. Walker, ...		...	50	0	0					
							50	0	0	
BALANCE OF 1862,										
Bank of Bengal,	757	8	9							
Cash in hand,	78	5	6							
				835	14	3				
Inefficient Balance, ...		...	1,277	3	6		2,113	1	9	
Carried over,							25,937	11	8	

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DISBURSEMENTS.

Brought over,...Rs.				5,454	13	10			
Paid Mr. E. Blyth on account of preparing Mammalia Catalogue,	250	0	0						
Printing 124 pages, of 200 copies of Catalogue of Mammalia, ...	254	0	0						
Salary of the Sub-Curator, at Rs. 100 per month, for 11 months,	1,100	0	0						
Establishment, ...	838	8	0						
Extra Taxidermists' Salary, ...	833	6	9						
Paid Passage-money for a Taxidermist to Burmah, ...	50	0	0						
Contingent Charges,... ...	645	15	8						
Lithographing and printing Charges including paper, ...	80	8	0						
Charges for Labelling Tickets of Fossil Shells, ...	19	0	0						
Matting the Bird Rooms with Zinc Sheets, ...	98	5	6						
Repair of old Mats, ...	6	0	0						
Freight, ...	78	12	0						
Purchase of Skeletons, ...	209	0	0						
A Teakwood Case for keeping Birds' Eggs, ...	50	0	0						
Two ditto Quadrumana Cases, at 300 Rs.	600	0	0						
A ditto working Cabinet, ...	50	0	0						
A ditto Meteorite Case, ...	135	12	0						
Purchased 32 Stone Bottoms for the Quadrumana Cases, ...	16	0	0						
A Blank Book, ...	6	8	0						
				8,469	3	11	6,192	0	0
SECRETARY'S OFFICE.									
General Establishment, ...	776	8	0						
Secretary's Office Establishment,	858	0	0						
Purchase of Postage Stamps, ...	92	0	6						
A Sheet Almanac for 1863, ...	1	8	0						
Printing Charges, ...	171	8	0						
Lithographing Charges, ...	6	0	0						
Two Blank Books, ...	16	4	0						
Stationery, ...	109	7	6						
Postage, ...	4	15	3						
Petty Charges, ...	10	14	3						
				2,047	1	6	1,979	3	3
VESTED FUND.									
Paid Commission upon Interest on the Government Securities, ...	12	12	11						
Ditto Income Tax on ditto, ...	0	7	5						
Ditto discount on the sale proceeds of Govt. Securities, ...	0	10	0						
Ditto fee for renewing Government Securities, ...	2	0	0						
				15	14	4	5	6	2
Carried over,...				15,987	1	7			

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RECEIPTS.

Brought over, ...Rs. 25,937 11 8

Carried over, 25,937 11 8

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DISBURSEMENTS.

					Brought over,...Rs.			15,987	1	7
MESSRS. WILLIAMS AND NORGATE.										
Paid their draft in favor of the Bank of Bengal, on account current, ...			2,000	0	0					
Purchase of 3 Copies of Mr. Laing's Lectures for them, ...			3	0	0					
								2,003	0	0
DEPOSIT.										
Quazee Abdool Quodoos,	...		5	10	0					
Major J. T. Walker,	...		24	0	0					
Narranjee Tricumjee, Esq.,	...		1	14	0					
Lieut.-Col. A. Phayre,	...		36	0	0					
F. Fedden, Esq., ...	...		22	0	0					
W. T. Dodsworth, Esq.,	...		18	0	0					
E. Blyth, Esq., ...	...		675	0	0					
Lieut.-Col. J. Abbott,	...		7	7	0					
Lieut. J. Johnstone,	...		18	0	0					
E. G. Glazier, Esq.,	...		18	0	0					
V. Irwin, Esq., ...	...		18	0	0					
Major J. J. M. Innes,	...		12	0	0					
R. A. Sterndale Esq.,	...		12	0	0					
J. Stephenson Esq,...	...		24	0	0					
T. H. Thornton, Esq.,	...		6	0	0					
T. B. Lane, Esq., ...	...		12	0	0					
Dr. Bhau Dajee, ...	...		18	0	0					
Capt. Raverty, ...	...		7	4	0					
Capt. J. P. Basevi, ...	...		18	0	0					
C. Campbell, Esq., ...	...		6	0	0					
								959	3	0
									657	0
COIN FUND.										
Paid Banghy Charges,	...		3	12	0					
Ditto Petty Charges,	...		2	10	6					
								6	6	6
									572	13
BUILDING.										
Assessment, ...	...		292	8	0					
Ditto for Lighting, ...	...		72	0	0					
Repairs of the Premises,	...		61	4	3					
								425	12	3
									380	0
MISCELLANEOUS.										
Advertising Charges,	...		9	12	0					
Meeting Charges, ...	...		168	9	6					
Wages of a Ticca Mally,	...		57	0	0					
Purchasing Receipt Stamps,	...		5	0	0					
A Clock Winder, ...	...		5	0	0					
Repair of a Carpet, ...	...		10	0	0					
Copying Charges of Arthava veda Brahmana for the American Oriental Society. ...	...		13	7	9					
Repair of Old Mats,	...		2	8	0					
						Carried over,...		19,381	7	4

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RECEIPTS.

Brought over, ... 25,937 11 8

Co.'s Rupees,... 25,937 11 8

Examined.

LALGOPAL DUTT,
Assistant Secretary.

Asiatic Society's Rooms,
The 31st December, 1863.

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DISBURSEMENTS.

					Brought over,...Rs.			19,381	7	4	
Paid Mr. A. M. Cameron as per Council order, dated 26th June, 1863, ...					50	0	0				
Ditto fee to the Bank of Bengal, for Stamping Cheques, ...					1	9	0				
Petty Charges, ...					28	0	9				
								350	15	0	302 5 9
BALANCE.											
Bank of Bengal,											
On account Vested Fund,	...5,360	0	0								
Do. Current Fund,	249	13	1		5,609	13	1				
Cash in hand, ...				...	104	6	3				
Inefficient Balance, ...				...	491	2	0	6,205	5	4	
				Co.'s Rs.				25,937	11	8	

W. L. HEELEY,
Secretary, As. Society.

STATEMENT

Abstract of the Oriental

RECEIPTS.

				1863.					1862.		
ORIENTAL PUBLICATIONS.											
Received by Sale of Bibliotheca Indica, ...	Rs.		1,610	15	0						
Ditto by Subscription to ditto, ...			158	2	0						
Ditto by Sale of White Yajur Veda,			151	10	0						
Refund of Postage Stamps, ...			7	6	0						
						1,928	1	0	1,193	9	0
GOVERNMENT ALLOWANCE.											
Received from the General Treasury at 500 Rs. per month, 12 months, ...			6,000	0	0						
						6,000	0	0	6,000	0	0
VESTED FUND.											
Received by Sale of Government Securities, ...			9,500	0	0						
Ditto Interest on ditto ditto, ...			262	1	9						
Ditto Pemium on ditto ditto, ...			540	0	0						
						10,302	1	9	440	0	0
CUSTODY OF ORIENTAL WORKS.											
Savings and Establishment, ...			2	8	0						
						2	8	0	17	0	9
DEPOSIT.											
Rao Saheb Vishwanath Narayan Mandlick, ...			25	0	0						
Pundit Gopeenath Nagar, ...			15	0	0						
						40	0	0			
BALANCE OF 1862.											
Bank of Bengal, ...	537	4	2								
Cash in hand, ...	2	8	8								
				539	12	10					
Inefficient Balance, ...				1,614	8	6					
						2,154	5	4			
Carried over,...						20,427	0	1			

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No. 2.

Fund for 1863.

DISBURSEMENTS.

	1863.			1862.		
ORIENTAL PUBLICATIONS.						
Commission on Sale of Books, Rs.	138	2	3			
Freight,...	108	12	0			
Packing Charges, ...	24	9	0			
Purchase of Postage Stamps, ...	14	0	0			
A Blank Book, ...	4	0	0			
Printing and Lithographing 500 Subn. Bills for the Bibliotheca Indica, ...	5	8	0			
Petty Charges, ...	12	5	3			
				307 4 6	220 15	9
VESTED FUND.						
Commission upon Interest on Government Securities, ...	0	8	10			
Ditto on Sale of Government Securities,...	23	12	0			
Discount on ditto ditto, ...	4	6	2			
Paid Fee for renewing a Government Security, ...	1	0	0			
Ditto Income Tax upon Interest on Government Securities, ...	1	10	10			
				31 5 10	9 13	9
CUSTODY OF ORIENTAL WORKS.						
Salary of Librarian, ...	330	0	0			
Establishment, ...	96	0	0			
Book-Binding, ...	212	0	0			
Books Cleaning, ...	66	10	0			
Banghy Expenses, ...	9	12	0			
Salary of a Ticca Duftory, ...	49	5	3			
Stamp-fee paid to the Bank of Bengal, ...	1	9	0			
Two Blank Books, ...	7	12	0			
52 Stone Bottoms for Book Cases,	26	0	0			
Petty Charges, ...	1	13	0			
				800 13 3	773 1	0
DEPOSIT.						
Pundit Gopeenath Nagar, ...	15	0	0			
				15 0 0	41 13	0
LIBRARY.						
Purchase of Books, ...	98	6	0			
				98 6 0	114 9	9
COPYING MSS.						
Copying Charges, ...	44	5	0			
				44 5 0		
VEDANTA SUTRAS.						
Editing Charges, ...	564	0	0			
Printing ditto, ...	1,770	2	0			
				2,334 2 0	675 4	0
			Carried over,...	3,631 4 7		

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RECEIPTS.

Brought over, ..Rs. 20,427 0 1

Co.'s Rs.,... 20,427 0 1

Examined.

LALGOPAL DUTT,
Assistant Secretary.

Asiatic Society's Rooms,
The 31st December, 1863.

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DISBURSEMENTS.

Brought over,...Rs.					3,631	4	7			
KA'VYA'DARS'A.										
Editing Charges, ...	...	460	0	0						
Printing ditto, ...	...	1,084	0	0						
					1,544	0	0			
SANKHYA APHORISMS OF KAPILA (Translation.)										
Printing Charges, ...	...	242	0	0						
					242	0	0			
SANHITA OF THE BLACK YAJUR VEDA.										
Editing Charges, ...	...	60	0	0						
Printing Charges, ...	...	448	0	0						
					508	0	0	224	0	0
TAITTIRI'YA BRA'HMANA.										
Editing Charges, ...	...	1,989	0	0						
Printing ditto, ...	...	916	0	0						
					2,905	0	0			
MAITRI UPANISHAD.										
Editing Charges, ...	...	120	0	0						
Printing ditto, ...	...	448	0	0						
					568	0	0			
SU'RYA SIDDHA'NTA.										
Compiling 21 pages of the Index to ditto, ...	...	32	0	0						
					32	0	0			
NA'RADA PANCHA RA'TRA.										
Charges for assistance in editing ditto, ...	...	35	0	0						
					35	0	0	542	12	0
TABAKTA'I NASIRI.										
Editing and Printing Charges, ...		584	0	0						
					584	0	0			
KA'MANDAKI.										
Printing Charges, ...	...	129	10	0						
					129	10	0	140	0	0
LALITA VISTARA.										
Printing Charges, ...	...	233	8	0						
					233	8	0			
PRA'KRITA VYA'KARANA.										
Printing Charges, ...	...	442	4	0						
					442	4	0			
SIDDHA'NTA SIROMANI.										
Printing Charges for the Index,...		54	12	0						
					54	12	0	214	8	0
BALANCE.										
In the Bank of Bengal,	9,451	4	1							
Cash in hand, ...	4	13	11							
				9,456	2	0				
Inefficient Balance, ...	...	61	7	6						
					9,517	9	6			
Co,'s Rs....					20,427	0	1			

W. L. HEELEY,
Secretary, As. Society.

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STATEMENT, No. 3.

Shewing the Assets and Liabilities of the Asiatic Society at the close of 1863.

CASH.		1863.	1862.
Bank of Bengal, on account sale proceeds of Govt. Securities,	5,360 0 0		
on current account,	249 13 1	5,609 13 1	757 8 9
Cash in hand,		104 6 3	78 5 6
Inefficient Balance,		491 2 0	1,277 3 6
Government Securities,		0 0 0	5,000 0 0
	Rs.	6,205 5 4	7,113 1 9
OUTSTANDINGS.			
Contribntions,	Rs.	5,250 1 11	4,156 10 8
Admission Fees,		320 0 0	224 0 0
Library Sale of Books,		373 0 0	291 8 0
Journal Subscription,		526 4 8	483 12 3
Ditto Sale of,		39 14 3	63 12 3
Government Allowance for Dec., 1863,		500 0 0	500 0 0
	Rs.	7,009 4 10	5,719 11 2

		1863.	1862.
Hon'ble Sir J. W. Colvile, Kt.,	Rs.	276 8 0	276 8 0
J. W. Laidlay, Esq.		418 7 4	418 7 4
Sundry deposits,		177 11 6	54 2 6
Messrs. Williams and Norgate, about		275 0 0	607 2 4
Salary, Establishment and Contingent Charges for December, 1863,		500 0 0	600 0 0
Printing Journal, III. and IV. of 1863, about,		650 0 0	1,710 8 0
Subscription to the Oriental Translation Fund, £42,		420 0 0	315 0 0
Bird Catalogue Binding,		42 4 0	42 4 0
	Rs.	2,759 14 10	4,024 0 2

Examined.

LALGOPAL DUTT,
Assistant Secretary.

W. L. HEELEY,
Secretary, As. Society.

ASIATIC SOCIETY'S ROOMS,
The 31st Dec., 1863.

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STATEMENT, No. 4.

Shewing the Assets and Liabilities of the Oriental Publication Fund at the close of 1863.

ASSETS.	1863.			1862.		
In the Bank of Bengal, ...Rs.	9,451	4	1	10,037	4	2
Cash in hand, ...	4	13	11	2	8	8
Inefficient Balance, ...	61	7	6	1,614	8	6
Government Allowance for Dec., 1863,	500	0	0	500	0	0
Bibliotheca Indica, Sale and Subscription of, ...	749	7	6	610	7	9
Rs.	10,767	1	0	12,764	13	1

LIABILITIES.	1863.			1862.		
Deposits, ...Rs.	171	13	0	146	13	0
Establishment and Contingencies for Dec. 1863,.....	50	0	0	50	0	0
Editing Charges due for works not yet complete, about, ...	1,600	0	0	1,922	8	0
Printing Charges, say, ...	740	0	0	4,000	0	0
Rs.	2,561	13	0	6,119	5	0

Examined.

LALGOPAL DUTT,

Assistant Secretary.

W. L. HEELEY,

Secretary, As. Society.

ASIATIC SOCIETY'S ROOMS,

The 31*st Dec.*, 1863.

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LIST OF MEMBERS.

ON THE 31ST DEC. 1863.

LIST OF ORDINARY MEMBERS.

The * distinguishes Non-Subscribing and the † Non-Resident Members.

Date of Election.		
1847 June	2.	†Abbott. Lieut.-Col. J., Artillery. — Umballa.
1860 Dec.	5.	Abdool Luteef, Khan Bahadur, Maulavi. — Calcutta.
1860 July	4.	†Ahmed, Saiëd, Khan Bahadur. — Ghazipore.
1862 April	2.	Aitchison, C. U. Esq., C. S. — Calcutta.
1862 April	4.	†Aitchison, J. E. T. Esq., M. D. — Lahore.
1859 Feb.	2	*Alabaster, C. Esq. — China.
1852 July	7.	*Allen, C. Esq., B. C. S. — Europe.
1860 Oct.	3.	Amir Ali, Khan, Múnshí. — Calcutta.
1843 Sept	4.	*Anderson, Lieut.-Col. W., Bengal Artillery. — Europe.
1861 May	1.	Anderson, T. Esq. M. D., F. L. S., Royal Bot. Garden. — Calcutta.
1860 Nov.	7.	†Anley, W. A. D. Esq. — Allahabad.
1862 Oct.	8.	Apurva Krishna, Rajah Bahadur. — Calcutta.
1859 Oct.	12.	Archer, Dr. C. — Calcutta.
1861 Sept.	4.	Asghur Ali, Khan Bahadur, Nawab. — Calcutta.
1861 July	3.	*Asphar, J. J. T. H. Esq. — Europe.
1860 Mar.	7.	Atkinson, Lieut.-Col. F. D. — Calcutta.
1855 July	4.	Atkinson, W. S. Esq., M. A., F. L. S. — Calcutta.
1861 Feb.	6	†Austen, Capt. H. H. G., H. M.'s 24 Foot, Surv. Genl.'s Dept. — Dehra Dhoon.
1826 Sept.	6.	Avdall, J. Esq. — Calcutta.
1835 Oct.	7.	*Baker, Col. W. E., Bengal Engineers. — Europe.
1860 Nov.	7.	Banerjea, Rev. K. M. — Calcutta.
1861 Mar.	6.	†Barnes, C. H Esq. — Bhagulpore.
1862 Aug.	6.	*Basevi, Capt. J. P., Bengal Engineers. — Europe.
1860 July	4.	†Batten, G H. M. Esq., B. C. S. — Allahabad.
1838 Jan.	3.	†Batten, J. H. Esq., B. C. S. — Agra.
1859 May	4.	Bayley, E. C. Esq., B. C. S. — Calcutta.

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Date of Election.		
1861 Feb.	6.	Bayley, S. C. Esq., B. C. S. — Calcutta.
1849 June	6.	Beadon, Hon'ble C., B. C. S. — Calcutta.
1841 April	7.	Beaufort, F. L. Esq., B. C. S. — Calcutta.
1861 Sept.	4.	*Beavan, Lieut. R. C., late 62nd B. N. I. — Europe.
1847 Aug.	4.	*Beckwith, J. Esq. — Europe.
1830 Sept.	1.	*Benson, Lieut.-Col. R. — Europe.
1862 Dec.	3.	†Bernard, C. E. Esq. — Nagpore.
1862 Aug.	6.	†Beverley, H. Esq., C. S. — Darjiling.
1862 June	4.	†Bhau Daji, Dr. — Bombay.
1862 July	2.	Bhola Nath Mullick, Bábu. — Calcutta.
1840 July	15.	*Birch, Major-General Sir R. J. H. K. C. B. — Europe.
1846 Mar.	4.	*Blagrave, Major T. C., 26th Regt., B. N. I. — Europe.
1859 Sept.	7.	Blane, Lieut.-Col. S. J. — Calcutta.
1857 Mar.	4.	Blanford, H. F. Esq., A. R. S. M., F. G. S. — Calcutta.
1859 Aug.	3.	†Blanford, W. T. Esq., A. R. S. M., F. G. S. Geol. Survey. — Bombay.
1857 Aug.	2.	*Bogle, Lieut.-Col. Sir A., Kt. — Europe.
1859 Aug.	3.	Bolie Chand Sing, Bábu. — Calcutta.
1861 Mar.	6.	Boulnois, C. Esq., B. A. — Calcutta.
1859 Oct.	12.	†Bowring, L. B. Esq., B. C. S. — Mysore.
1854 Nov.	1.	*Boycott, Dr. T., B. M. S. — Europe.
1860 Mar.	7.	†Brandis, Dr. D. — Rangoon.
1860 Oct.	3.	*Brandreth, J. E. L. Esq. — Europe.
1862 Jan.	15.	†Briggs, Major D. — Assam.
1847 June	2.	*Brodie, Capt. T., 5th Regt., B. N. I. — Europe.
1860 Nov.	7.	†Browne, Capt. Horace A. — Rangoon.
1860 Mar.	7.	Browne, Rev. J. Cave, M. A. — Calcutta.
1863 Aug.	5.	†Bunkim Chunder Chatterjea, B. A. — Khoolneah.
1860 July	4.	†Bunsput Sinha, Rajah. — Allahabad.
1856 Sept.	3.	Busheerooddin, Sultan Mohammad. — Chinsurah.
1860 July	4.	†Byrne, L. F. Esq., C. E. — Lahore.
1859 April	6.	Calcutta, Right Rev. Lord Bishop of, — Calcutta.
1860 June	6.	†Campbell, C. J. Esq., C. E. — Delhi.
1859 Sept.	7.	*Campbell, Dr. A. — Europe.
1863 June	3.	Campbell, Hon'ble G. — Calcutta.
1860 Jan.	4.	†Carnac, J. H Rivett, Esq., B. C. S. — Nagpore.
1856 Sept.	3.	Chapman, R. B. Esq., B. C. S. — Calcutta.
1860 Oct.	3.	†Christian, J. Esq. — Monghyr.
1863 Aug.	5.	†Chunder Nath Roy, Cowar. — Nattore.
1863 June	3.	†Chunder Sekur Roy, Rajah. — Julpigori.
1863 April	1.	†Cleghorn, Dr. H., Conservator of Forests. — Lahore.
1863 June	3.	†Clementson, E. W. Esq. — Moulmein.
1861 Sept.	4.	†Cockburn, J. F. Esq., C. E. — Kurhurbari Colliery.
1862 April	2.	†Colles, J. A. P. Esq., M. D. — Peshawur.

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Date of Election.			
1851	Mar.	5. *Colvin, J. H. B. Esq., B. C. S.	Europe.
1860	Dec.	5. †Cooper, F. H. Esq., B. C. S.	Delhi.
1857	Mar.	4. Cowell, E. B. Esq., M. A.	Calcutta.
1861	July	3. *Crockett, Oliver R. Esq.	China.
1862	April	2. †Dalrymple, F. A. E. Esq., C. S.	Chittagong.
1847	June	2. †Dalton, Lieut.-Col. E. T., 9th Regt. B. N. I.	Chota Nagpore.
1861	Mar.	6. †Davey, N. T. Esq., Revenue Survey.	Sylhet.
1861	Sept.	4. Davidson, Capt. E., Bengal Engineers.	Calcutta.
1861	Nov.	6. *Davies, R. H. Esq., B. C. S.	Europe.
1856	June	4. †DeBourbel, Major R., Bengal Engrs.	Allahabad.
1861	June	5. Denison, His Excellency Sir W., K. C. B.	Calcutta.
1863	Feb.	4. †Deo Narain Sing, The Hon'ble Rajah.	Benares.
1863	June	3. †Depree, Capt. G. C., Royal Artillery.	Chota Nagpore.
1861	Mar.	6. *Devereux, Hon'ble H. B., B. C. S.	Europe.
1862	May	7. †Dhunpati Sinha Dooghur, Bábu.	Moorshedabad.
1853	Sept.	7. Dickens, Lieut.-Col. C. H.	Calcutta.
1863	Oct.	7. Dickens, Major A. D.	Calcutta.
1863	Dec.	2. Dickens, T. Esq.	Calcutta.
1860	Nov.	7. Digumber Mitra, Bábu.	Calcutta.
1861	Jan.	9. †Dodsworth, W. T. Esq.	Meerut.
1859	Sept.	7. Douglas, Lieut.-Col. C.	Calcutta.
1854	July	5. †Drummond, Hon'ble E., B. C. S.	Allahabad.
1863	Nov.	4. Duff, W. P. Esq.	Calcutta.
1861	Feb.	6. †Duhan, H. Esq., G. T. Survey.	Dehra Dhoon.
1860	Jan.	4. *Duka, Dr. T.	Europe.
1861	May	1. †Earle, Capt. E. L., Bengal Artillery.	Kurnal.
1857	May	6. *Eatwell, Dr. W. C. B.	Europe.
1840	Oct.	7. *Edgeworth, M. P. Esq., B. C. S.	Europe.
1863	Mar.	4. †Eden, Hon'ble A.	Bhootan.
1863	May	6. †Edgar, W. Esq., B. C. S.	Dacca.
1859	May	4. *Edmonstone, Hon'ble G. F., B. C. S.	Europe.
1846	Jan.	7. *Elliott, Hon'ble Walter, M. C. S.	Europe.
1859	Nov.	2. †Elliott, C. A. Esq., B. C. S.	Hoshungabad.
1863	April	1. Ellis, Hon'ble R. S., C. B. C. S.,	Calcutta.
1856	Mar.	5. *Ellis, Lieut.-Col. R. R. W., 23rd Regt. B. N. I.	Europe.
1854	Nov.	1. †Elphinstone, Capt. N. W. 4th Regt. B. N. I.	Jullundur.
1861	Jan.	9. †Erskine, Hon'ble C. J., B. C. S.	Bombay.
1856	Aug.	6. *Erskine, Major W. C., C. B.	Europe.
1863	Oct.	7. Ewart, Dr. J.	Calcutta.
1862	Aug.	6. *Eyre, Col. Vincent, C. B.	Europe.
1851	May	7. Fayrer, Dr. J., B. M. S.	Calcutta.

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Date of Election.			
1863	Jan. 15.	†Fedden, Francis, Esq., Geol. Survey.	Bassein.
1859	Oct. 12.	Fisher, A. Esq.	Calcutta.
1860	Mar. 7.	Fitzwilliam, Hon'ble W. S.	Calcutta.
1861	Feb. 6.	†Forrest, R. Esq., Civil Engineer.	Dehra Dhoon.
1863	Dec. 2.	†Forsyth, J. Esq.	Seonee.
1863	June 3.	†Forsyth, T. D. Esq., C. B.	Lahore.
1860	Jan. 4.	†Fraser, Capt. A.	Alguada, Reef.
1860	Mar. 7.	†Frere, His Excellency Sir H. Bartle, K. C. B., B. C. S.	Bombay.
1861	Sept. 4.	†Fuller, Capt. A. R.	Lahore.
1859	Oct. 12.	†Furlong, Capt. J. G. R.	Agra.
1859	Dec. 7.	Futteh Ali, Maulavi.	Calcutta.
1849	Sept. 5.	†Fytche, Lieut.-Col. A., 70th Regt. B. N. I.	Maulmein.
1859	Sept. 7.	†Gardener, D. M. Esq., B. C. S.	Meerut.
1859	Aug. 3.	Gastrell, Lieut.-Col. J. E., 13th Regt. N. I., Rev. Survey.	Calcutta.
1859	Sept. 7.	Geoghegan, J. Esq., B. C. S	Calcutta.
1842	Sept. 2.	*Gladstone, W. Esq.	Europe.
1862	April 2.	†Glazier, E. G. Esq., C. S.	Backergunge.
1859	Sept. 7.	Goodeve, E. Esq., M. D.	Calcutta.
1862	July 2.	*Gordon, J. D. Esq., C. S.	Europe.
1860	Sept. 5.	†Goss, W. Forbes, Esq.	Sumbulpore.
1862	Feb. 5.	†Gourdoss Bysack, Bábu.	Khoolneah.
1840	Sept. 6.	Govin Chunder Sen, Bábu.	Calcutta.
1863	Nov. 4.	†Gowan, Major J. G.	Saugur.
1860	July 4.	Grant, J. P. Esq. Jr., B. C. S.	Calcutta.
1859	Dec. 7.	*Grant, Sir J. P., K. C. B.	Europe.
1860	Jan. 4.	Grant, T. R. Esq.,	Calcutta.
1860	July 4.	Grey, Hon'ble W., B. C. S.	Calcutta.
1861	Sept. 4.	†Griffin, L. Esq., B. C. S.	Guzerat.
1860	Nov. 7.	†Griffith, R. T. H. Esq.	Benares.
1849	Aug. 1.	Grote, A. Esq., B. C. S., F. L. S.	Calcutta.
1861	Feb. 6.	*Growse, F. S. Esq., B. C. S.	Europe.
1860	Dec. 5.	†Guru Churn Doss, Bábu.	Berhampore.
1862	Feb. 5.	Guthrie, Col. C. S., Bengal Engineers.	Calcutta.
1847	June 2.	*Hall, F. E. Esq., M. A., D. C. L.	Europe.
1860	May 2	*Halleur, Dr. H.	Europe.
1863	June 3.	†Hamilton, Col. G. W.	Delhi.
1855	Mar. 7.	*Hamilton, R. Esq.	China.
1828	Nov. 12.	*Hamilton, Sir R. N. E., Bart., B. C. S.	Europe.
1847	May 5.	*Hannyngton, Col. J. C., 63rd Regt. N. I.	Europe.
1859	Oct. 12.	*Hardie, Dr. G. K.	Europe.
1863	Mar. 4.	Hari Doss Dutt, Bábu.	Calcutta.
1862	Oct. 8.	Harington, Hon'ble H. B.	Calcutta.

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Date of Election.			
1860 Oct.	3.	†Harris, E. B. Esq., Civil Surgeon.	Monghyr.
1861 Feb.	6.	†Harrison, A. S. Esq., B. A.	Behar.
1859 Oct.	12.	†Haughton, Lieut.-Col. J. C.	Assam.
1848 May	3.	*Hearsay, Major-Genl. Sir J. B., K.C.B.	Europe.
1862 Aug.	6.	Heeley, W. L. Esq., B. C. S.	Calcutta.
1859 Aug.	3.	*Henessey, J. B. N. Esq.	Europe.
1853 July	6.	†Herschel, W. J. Esq., B. C. S.	Purneah.
1854 Mar.	1.	*Hichens, Lieut. W., Bengal Engineers.	Europe.
1860 May	2.	Hobhouse, C. P. Esq., B. C. S.	Calcutta.
1862 Oct.	8.	Hogg, C. S. Esq.	Calcutta.
1859 Sept.	7.	*Hopkinson, Major H.	Europe.
1863 July	1.	†Horne, C. Esq., C. S.	Benares.
1860 Mar.	7.	†Hovenden, Major J. J., Bengal Engrs.	Allahabad.
1863 Jan.	15.	†Howell, M. S. Esq., C. S.	Bareilly, Rohilkund.
1862 July	2.	Hyde, Lieut.-Col. H., Royal Bengal [Engineers.	Calcutta.
1860 Jan.	4.	†Innes, Major J. J. M.	Lahore.
1862 Oct.	8.	†Irwin, Valentine, Esq , C. S.	Dinajpore.
1853 Dec.	7.	†Ishureeprasád Sinha, Bahadur, Rajah.	Benares.
1861 Jan.	9.	Jackson Hon'ble L. S., B. C. S.	Calcutta.
1841 April	7.	*Jackson, W. B. Esq., B. C. S.	Europe.
1851 April	2.	Jádava Krishna Sinha, Bábu.	Calcutta.
1860 Jan.	4.	Jalláluddin Mohammad, Prince.	Calcutta.
1861 Dec.	4.	†James, Major H. R., C. B.	Peshawur.
1845 Dec.	3.	†Jerdon, T. C. Esq., M. M. S.	Umballa.
1862 July	2.	Johnson, Major A. B., Bengal Staff Corps.	Calcutta.
1847 June	2.	*Johnstone, J. Esq.	Europe.
1862 Mar.	5.	†Johnstone, Lieut. J., Assistant Commissioner.	Bunnoo.
1859 Sept.	7.	*Jones, R. Esq.	Europe.
1857 April	1.	Joygopal Bysack, Bábu.	Calcutta.
1853 May	4	†Kabeeruddin Ahmed, Huzrut Shah.	Sasseram.
1858 Feb.	3.	Kaliprasanno Sinha, Bábu.	Calcutta.
1863 July	1.	Kane, H. S. Esq , M. D.	Calcutta.
1859 Mar.	2.	Kásinath Roy Chaudhuri, Bábu.	Cásipore, Calcutta.
1850 April	3.	Kay, Rev. W., D. D.	Calcutta.
1861 Dec.	4.	†Kempson, M. Esq., M. A.	Bareilly.
1862 Jan.	15.	†King, W. Esq., Jr., Geological Survey.	Madras.
1839 Mar.	6.	*Laidlay, J. W. Esq.	Europe.
1861 Mar.	6.	*Laing, Hon'ble S.	Europe.
1863 Sept.	2.	Lane, T. B. Esq., B. C. S.	Calcutta.
1851 Dec.	3.	†Layard, Major F. P.	Bhagulpore.

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Date of Election.		
1852 April 7.	Lees, Capt. W. N., LL.D.	Calcutta.
1859 Dec. 7.	Leonard, H. Esq., C. E.	Calcutta.
1863 May 6.	Levinge, Hon'ble E. P.	Calcutta.
1856 Feb. 6.	*Liebig, Dr. G. Von., B. M. S.	Europe.
1860 Jan. 4.	Lindsay, E. J. Esq.	Calcutta.
1861 Nov. 6	†Lloyd, Capt. M.	Tounghoo.
1862 Dec. 3.	†Lobb, S. Esq., M. A.	Dacca.
1835 Oct. 7.	Loch, G. Esq., B. C. S.	Calcutta.
1828 July 2.	*Low, Major-General Sir J., K. C. B.	Europe.
1861 April 3.	†Lumsden, Major P. S.	Murree.
1854 Nov. 1.	*Lushington, F. A. Esq., B. C. S.	Europe.
1863 April 1.	†MacDonald, Capt. D., Rev. Survey.	Bengal.
1860 Dec. 5.	Macfarlane, D. H. Esq.	Calcutta.
1848 April 5.	†Maclagan, Lieut.-Col R.	Murree.
1862 Mar. 5.	Macnamara, Dr. F. N.	Calcutta.
1853 April 6.	Macrae, Dr. A. C., B. M. S.	Calcutta.
1863 Jan. 15.	Maine, Hon'ble H. S.	Calcutta.
1860 Jan. 4.	Mair, D. K. Esq., M. A.	Calcutta.
1862 Sept. 3.	Mallet, F. R. Esq.	Calcutta.
1860 July 4.	*Man, E. G. Esq.	Europe.
1852 Nov. 3.	Manickjee Rustomjee, Esq.	Calcutta.
1861 June 5.	†Mán Sinha Bahadur, Mahárajah.	Oudh.
1850 Jan. 2.	*Marshman, J. C. Esq.	Europe.
1862 Sept. 3.	†Martin, R. L. Esq., B. A.	Dacca.
1863 Nov. 4.	Martin, R. T. Esq.	Calcutta.
1863 Oct. 7.	Martin, T. Esq.	Calcutta.
1863 Nov. 4.	McClelland, Dr. J.	Calcutta.
1862 July 3.	McCrindle, J. W. Esq., M. A.	Calcutta.
1837 Oct. 4.	†McLeod, D. F. Esq., C. B., B. C. S.	Lahore.
1860 Mar. 7.	Medlicott, H. B. Esq., F. G. S.	Calcutta.
1853 April 6.	†Medlicott, J. G. Esq., B. A.	Midnapore.
1861 Feb. 6.	†Melville, Capt. A. B., late 67th N. I. Surv. Genl.'s Dept.	Gwalior.
1855 Nov. 7.	*Middleton, J. Esq.	Europe.
1850 April 3.	*Mills, A. J. M. Esq., B. C. S.	Europe.
1863 Nov. 4	†Modhoosoodun Doss, Bábu.	Dacca.
1860 April 4.	†Money, A. Esq., B. C. S.	Bhagulpore.
1847 April 7.	*Money, D. J. Esq., B. C. S.	Europe.
1856 Feb. 6.	Money, J. W. B. Esq.	Calcutta.
1862 July 2.	Monteath, A. M. Esq., B. C. S.	Calcutta.
1860 Feb. 1.	†Montgomerie, Capt. T. G., B. E., F. R. G. S., Trigonometrical Survey.	Dehra Dhoon.
1854 Dec. 6.	*Morris, G. G. Esq., B. C. S.	Europe.
1837 July 5.	*Muir, J. Esq.	Europe.
1854 Oct 11.	†Muir, W. Esq., B. C. S.	Allahabad.
1859 Aug. 3.	†Murray, Lieut. W. G., 68th N. I.	Rewah.

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Date of Election.			
1862	July	2.	Napier, Hon'ble Major-Genl. Sir R., K. C. B. — Calcutta.
1860	Nov.	7.	†Newmarch, Major C. D. — Pegu.
1852	Sept.	1.	*Nicholls, Capt. W. T., 24th Regiment M. N. I. — Europe.
1863	Sept.	2.	†Norman, Capt. F. B. — Lahore.
1863	Jan.	15.	Norman, Hon'ble J. P. — Calcutta.
1862	April	2.	Norman, Lieut.-Col. H. W., C. B. — Calcutta.
1859	Aug.	3.	Obbard, J. Esq. — Calcutta.
1860	June	4.	†Oldham, C. Esq., Geological Survey. — Madras.
1851	June	4.	Oldham, T. Esq., LL. D., F. R. S. — Calcutta.
1837	June	7.	*O'Shaughnessy, Sir W. B. — Europe.
1847	Feb.	10.	*Ousely, Major W. R. — Europe.
1862	May	7.	Partridge, S. B. Esq., M. D. — Calcutta.
1860	Feb.	1.	†Pearse, Major G. G. — Madras.
1861	June	5.	†Pelly, Lt.-Col. L., Bombay Army. — Bushire.
1835	July	1.	†Phayre, Lt.-Col. A. P., C. B. — Rangoon.
1862	Oct.	8.	†Poolin Behary Sen, Bábu. — Berhampore.
1863	July	1.	†Porter, G. E. Esq., C. S. — Burdwan.
1849	Sept.	5.	Pratapchandra Sinha Rajah, Bahadur. — Calcutta.
1839	Mar.	6.	†Pratt, Ven'ble Archdeacon J. H., M. A. — N. W. Prov.
1860	Jan.	4.	Preonath Sett, Bábu. — Calcutta.
1825	Mar.	9.	*Prinsep, C. R. Esq. — Europe.
1837	Feb.	1.	Prosonno Coomar Tagore, Bábu. — Calcutta.
1862	April	2.	†Raban, Major H. — Chera Poonjee.
1853	April	6.	Radha Nath Sikdar, Bábu. — Calcutta.
1849	Sept.	5.	Rajendra Dutt, Bábu. — Calcutta.
1856	Mar.	5.	Rajendralala Mitra, Bábu. — Calcutta.
1837	Feb.	1.	Ramánath Tagore, Bábu. — Calcutta.
1840	Aug.	5.	Ramgopal Ghose, Bábu. — Calcutta.
1860	Mar.	7.	*Reid, H. S. Esq. — Europe.
1854	June	7.	*Riddell, H. B. Esq., B. C. S. — Europe.
1860	Nov.	7.	†Riley, E. O. Esq., F. G. S. — Bassein.
1856	Aug.	6.	Roberts, Hon'ble A., B. C. S. — Calcutta.
1863	April	1.	†Robertson, C. Esq., C. S. — Banda.
1863	May	6.	†Robertson, H. D. Esq., C. S. — Saharunpore.
1862	Mar.	5.	†Robinson, Capt. D. G., Bengal Engineers. — Dehra Dhoon.
1853	Aug.	3.	*Roer, Dr. E. — Europe.
1847	Dec.	1.	*Rogers, Capt. T. E. — Europe.
1863	Mar.	4.	Rogers, H. M. Esq., C. S. — Calcutta.
1859	Sept.	7.	†Russell, A. E. Esq., B. C. S. — Berhampore.
1856	Feb.	6.	†Russell, R. H. Esq., B. C. S. — Midnapore.
1860	July	4.	Sampson, A. B. Esq., B. A. — Calcutta.

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Date of Election.			
1863	Nov.	4.	Sandeman, H. D. Esq., B. C. S.	Calcutta.
1859	Feb.	2	†Satischunder Roy, Mahárajah.	Krishnagur.
1856	Aug.	6.	Satyasharana Ghosal, Rajah.	Bhookylas, Calcutta.
1861	Dec.	4.	†Saunders, C. B. Esq., B. C. S.	Mysore.
1854	Dec.	6.	†Saxton, Lt.-Col. G. H., 38th M. N. I.	Cuttack.
1854	May	2.	Schiller, F. Esq.	Calcutta.
1860	Feb.	1.	*Scott, Col. E. W. S.	Europe.
1859	Aug.	3.	†Scott, W. H. Esq.	Dehra Dhoon.
1863	Sept.	2.	Shama Churn Sirkar, Bábu.	Calcutta.
1860	July	4.	†Shelverton, G. Esq.	Dehra Dhoon.
1845	Jan.	14.	*Sherwill, Lt.-Col. W. S., 66th Regiment B. N. I., F. G. S., F. R. G. S.	Europe.
1859	Sept.	7.	†Sherwill, Major J. L.	Raneegunge.
1863	April	1.	†Showers, Major C. L.	Madras.
1860	July	4.	†Simpson, Dr. B.	Darjiling.
1856	Feb.	6.	*Smith, Col. J. F.	Europe.
1859	Mar.	2.	Smith, H. Scott, Esq., B. A.	Calcutta.
1862	Feb.	5.	†Smyth, Capt. E.	Almorah.
1854	Sept.	6.	†Spankie, R. Esq., B. C. S.	Meerut.
1863	Jan.	15.	†Squire, J. Esq.	Hooghly.
1859	Mar.	2.	Stainforth, H. Esq.	Calcutta.
1860	May	2.	†Staunton, Major F. S., Beng. Engrs.	Bengal.
1843	Sept.	4.	*Stephen, Major J. G. 8th N. I.	Europe.
1863	April	1.	Stephenson, J. Esq., B. A.	Calcutta.
1863	Jan.	15.	†Sterndale, R. A. Esq.	Seonee, Jubbulpore.
1862	Oct.	8.	†Stevens, C. C. Esq.	Sooree, Beerbhoom.
1863	May	6.	†Stevens, W. H. Esq.	Sylhet.
1863	Sept.	2.	Stewart, D. Esq.	Calcutta.
1861	Feb.	6.	†Stewart, Lieut. W. J., Bengal Artillery, Revenue Survey.	Bengal.
1861	Sept	4.	*Stewart, Major P.	Europe.
1863	Nov.	4.	Stoliczka, Dr. F.	Calcutta.
1848	June	7.	Strachey, J. Esq., B. C. S.	Calcutta.
1843	May	3.	†Strachey, Lt.-Col. R., F. R. S., F. L. S., F. G. S.	Simla.
1859	Mar.	2.	†Stubbs, Capt. F. W., Bengal Artillery	Mean Meer.
1861	Oct.	2.	†Sudderuddin Moonshi.	Pundooah.
1858	July	7.	†Sutherland, H. C. Esq., B. C. S.	Pegu.
1860	May	2.	†Temple, R. Esq, B. C. S.	Nagpur.
1859	Mar.	2.	†Theobald, W. Esq., Jr., Geological Survey.	Thayet-Myo.
1860	Jan.	4.	Thompson, Rev. J. C.	Calcutta.
1860	June	6.	Thompson, J. G. Esq.	Calcutta

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Date of Election.			
1863	Mar.	4.	†Thompson, Capt. G. H., Bengal Staff Corps. — Hazareebag.
1855	June	6.	*Thomson, Dr. T., M. D., F. R. S., F. L. S., F.R.G.S. — Europe.
1853	Nov.	21.	†Thornhill, C. B. Esq., B. C. S. — Allahabad.
1863	June	4.	†Thornton, T. H. Esq. — Delhi.
1847	June	2.	Thuillier, Lt.-Col. H. L., F.R.G.S., Bengal Artillery. — Calcutta
1863	May	6.	Thuillier, Lt. H. R. — Calcutta.
1862	July	2.	Thurlow, Hon'ble T. J. H. — Calcutta.
1859	Nov.	2.	†Tickell, Lt.-Col. S. R. — Pegu.
1862	Feb.	5.	†Torrens, Col. H. D. — Simla.
1861	June	5.	†Tremlett, J. D. Esq., C. S. — Jullundur.
1863	Mar.	4.	Trevelyan, Right Hon'ble Sir C., K. C. B. — Calcutta.
1841	Feb.	3.	*Trevor, Hon'ble C. B., B. C. S. — Europe.
1863	Feb.	4.	Trevor, E. T. Esq. B. C. S. — Calcutta.
1860	Mar.	7.	†Turnbull, Lt.-Col. A. D. — Roorkee.
1861	Sept.	4.	Tween, A. Esq., Geological Survey. — Calcutta.
1863	May	6.	†Tyler, Dr. J. — Etah.
1860	May	2.	†Vanrenen, Capt. A. D., late 71st B. N. I., R. Survey. — Saugor.
1863	Oct.	7.	Waheedoon Nubbee, Maulavi, Khan Bahadoor. — Calcutta.
1861	Oct.	2.	Walagohur Mohammad, Sahebzadah. — Calcutta.
1861	May	1.	*Walker, Major J. T., Bombay Engrs. — Europe.
1863	Dec.	2.	Walker, A. G. Esq. — Calcutta.
1863	May	6.	Wall, P. W. Esq., C. S — Calcutta.
1863	Oct.	7.	Waller, Dr. W. K. — Calcutta.
1863	Dec.	2.	Walters, Rev. M. D. C. — Calcutta.
1862	Jan	15.	Ward, G. E. Esq. B.C.S. — Saharunpore.
1852	July	7.	*Ward, J. J. Esq., B. C. S. — Europe.
1859	July	6.	†Warrand, R. H. M. Esq. B. C. S — Cawnpore.
1854	July	5.	*Watson, J. Esq., B. C. S. — Europe.
1847	Nov.	3	*Waugh, Major-General Sir A. S., C. B., F. R. S., F. R. G. S. — Europe.
1862	Oct.	8.	Wheeler, J. T. Esq. — Calcutta.
1861	Sept.	4.	†Williams, Dr. C., H. M.'s 68th Regt. — Mandelay.
1859	Aug.	3	†Wilmot, C. W. Esq. — Nya Doomka.
1862	Oct	8.	†Wilson, R. H. Esq. — Chittagong.
1859	Sept.	7.	†Willson, W. L. Esq. — Beerbhoom.
1851	May.	7.	Woodrow, H. Esq., M. A. — Calcutta.
1859	Mar.	2.	*Wortley, Major A. H. P. — Europe.
1862	Aug.	6.	Wyllie, J. W. Esq., Bombay C. S. — Calcutta.
1855	April	4.	*Young, Lt.-Col. C. B. — Europe.
1856	July	2	*Yule, Lt.-Col. H. — Europe.

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LIST OF HONORARY MEMBERS.

Date of Election.				
1825	Mar.	9.	M. Garcin de Tassy, Membre de l' Instit.	Paris.
1826	„	1	Sir John Phillippart.	London.
1829	July	1.	Count De Noe.	Paris.
1831	Sept.	7.	Prof. Francis Bopp, Memb. de l'Academie.	Berlin.
1831	„	7	Prof. C. Lassen.	Bonn.
1834	Nov.	5.	Sir J. F. W. Herschel, F. R. S.	London.
1834	„	5	Col. W H. Sykes, F. R. S.	London.
1835	May	6	Prof. Lea.	Philadelphia.
1840	Mar.	4.	M. Reinaud, Memb. de l' Instit., Prof. de l' Arabe.	Paris.
1842	Feb.	4.	Dr. Ewald.	Gottingen.
1842	„	4	Right Hon'ble Sir Edward Ryan, Kt.	London.
1843	Mar.	30	Prof. Jules Mohl, Memb. de l' Instit.	Paris.
1847	May	5.	His Highness Hekekyan Bey.	Egypt.
1847	Sept.	1.	Col. W. Munro.	London.
1847	Nov.	3.	His Highness the Nawab Nazim of Bengal.	Moorshedabad.
1848	Feb.	2.	Dr. J. D. Hooker, R. N., F. R. S.	London.
1848	Mar.	8.	Prof. Henry.	United States.
1853	April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B., F. R. S., D. C. L.	London.
1854	Aug.	2	Col. Sir Proby T. Cautley, K. C. B., F. R. S.	London.
1855	Mar.	7.	Rájá Rádhákánta Deva, Báhádur.	Calcutta.
1858	July	6.	B. H. Hodgson, Esquire.	Europe.
1858	„	6.	Dr. H. Falconer, F. R. S., B. M. S.	Europe.
1859	Mar.	2	Hon'ble Sir J. W. Colvile, Kt.	Europe.
1860	„	7.	Prof. Max Müller.	Oxford.
1860	Nov.	7.	Mons. Stanislas Julien.	Paris.
1860	„	7	Col. Sir George Everest, Kt., F. R. S.	London.
1860	„	7.	Dr. Robert Wight.	London.
1860	„	7.	Edward Thomas, Esquire.	London.
1860	„	7	Dr. Aloys Sprenger.	Germany.
1860	„	7.	Dr. Albrecht Weber.	Berlin.

LIST OF CORRESPONDING MEMBERS.

1844	Oct.	2.	MacGowan, Dr. J.	Europe.
1856	June	4.	Kremer, Mons. A Von.	Alexandria.
1856	„	4.	Porter, Rev. J.	Damascus.
1856	„	4.	Schlagintweit, Herr H.	Berlin.
1856	„	4.	Smith, Dr. E.	Beyrout.
1856	„	4	Tailor, J., Esquire.	Bussorah.

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Date of Election.			
1856	„ 4.	Wilson, Dr.	Bombay.
1857	Mar. 4	Neitner, J , Esquire.	Ceylon.
1858	„ 3.	Schlagintweit, Herr R.	Berlin.
1859	Nov. 2.	Frederick, Dr H.	Batavia
1859	May 4.	Bleeker, Dr. P.	Batavia.
1860	Feb. 1.	Baker, Rev. H.	E. Malabar.
1860	„ 1.	Swinhoe, R., Esquire, H. M.'s Consulate,	Amoy.
1860	April 4.	Haug, Dr. M.	Poonah.
1861	July 3	Gosche, Dr. R.	Berlin.
1862	Mar. 5.	Murray, A , Esquire.	London.
1863	Jan. 15.	Goldstücker, Dr. T.	London.
1863	July, 4.	Barnes, R. H. Esquire.	Ceylon.

LIST OF ASSOCIATE MEMBERS.

1835	Oct. 7.	Stephenson, J., Esquire.	Europe.
1838	Feb. 7.	Keramut Ali, Saiëd.	Hooghly.
1843	Dec. 6.	Long, Rev. J.	Europe.
1845	Jan. 14.	Blyth, E., Esquire.	Europe.

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ELECTIONS IN 1868.

Ordinary Members.

F. Fedden, Esq., Geological Survey.	Rangoon.
M. S. Howell, Esq., C. S.	Rohilkund.
Hon'ble H. S. Maine.	Calcutta.
„ J. P. Norman.	Ditto.
R. A. Sterndale, Esq.	Jubbu'pore.
J. Squire, Esq.	Hooghly.
The Hon'ble Rajah Deo Narain Singh.	Benares.
E. T. Trevor, Esq., C. S.	Calcutta.
Hon'ble A. Eden.	Bhootan.
Bábu Haridoss Dutt.	Calcutta.
H. M. Rogers, Esq., C. S.	Ditto.
The Right Hon'ble Sir C. Trevelyan, K. C. B.	Ditto.
Capt. G. H. Thompson, Bengal Staff Corps, R. Survey.	Hazareebaug.
C. Robertson, Esq. C. S.	Banda.
Capt. D. MacDonald, R. Survey. Dept.	Darjiling.
Dr. H. Cleghorn.	Lahore.
Major C. L. Showers.	Madras.
Hon'ble R. S. Ellis, C. S., C. B.	Calcutta.
J. Stephenson, Esq., B. A.	Calcutta.
W. Edgar, Esq., B. C. S.	Dacca.
Lieut. H. R. Thuillier, Royl. Engrs.	Calcutta.
Hon'ble E. P. Levinge.	Ditto.
P W. Wall, Esq., C. E.	Ditto.
Dr. J. Tyler.	Etah.
H. D. Robertson, Esq., C. S.	Saharunpore.
W. H. Stevens, Esq.	Sylhet.
Hon'ble G. Campbell.	Calcutta.
Rajah Chunder Sekur Roy.	Julpigori.
Capt. G. C. Depree, Royal Artillery.	Chota Nagpur.
E. W. Clementson, Esq	Bassein.
T. D. Forsyth, Esq., C. B.	Lahore.
Col. G. W. Hamilton.	Delhi.
T. H. Thornton, Esq.	Ditto.
C. Horne, Esq., C. S.	Benares.
H. S. Kane, Esq., M. D., Geological Survey.	Calcutta.
G. E. Porter, Esq., C. S.	Burdwan.
Bábu Bunkim Chunder Chatterjea, B. A.	Khoolneah.
Coomar Chunder Nath Roy.	Nattore.
Babu Shama Churn Sirkar.	Calcutta.
T. B. Lane, Esq., B. C. S.	Ditto.
Capt. F. B. Norman,	Lahore.
D. Stewart, Esq.	Calcutta.
Major A. D. Dickens.	Ditto.
Dr. W. K. Waller.	Ditto.
T. Martin, Esq.	Ditto.

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Dr. J. Ewart, Prof. Physiology, Medl. College.	Calcutta.
Maulavi Waheedoon Nubbee Khan Bahadur.	Ditto.
W. P. Duff, Esq.	Ditto.
Major J. G. Gowan.	Saugor.
R T. Martin, Esq.	Calcutta.
Dr. J. McClelland.	Ditto.
Bábu Modhoosoodun Doss.	Dacca.
H. D. Sandeman, Esq.	Calcutta.
Dr. F. Stoliczka.	Ditto.
J. Forsyth, Esq.	Seonee.
A. G. Walker, Esq.	Calcutta.
T. Dickens, Esq.	Ditto.
Rev. M. D. C. Walters.	Ditto.

Corresponding Members.

Dr T. Goldstücker.	London.
R. H. Barnes, Esq.	Ceylon.

LOSS OF MEMBERS DURING THE YEAR 1863.

By retirement.

W. Grapel, Esq.	Calcutta.
Bábu Rajkissen Roy.	Berhampore.
H Braddon, Esq.	Calcutta.
Rev. T. H. Burn.	Ditto.
J. J. Grey, Esq.	Shahabad.
D. Fitzpatrick, Esq.	Dhurmsala.
Rt. Hon'ble Sir Mordaunt Wells.	Europe.
Lieut.-Col. H. C. James.	Calcutta.
S. Wauchope, Esq., C. B. B. C. S.	Ditto.
Sanders, J. Esq.	Ditto.
Fitzgerald, Major C. M.	Ditto.
Dr. G. Gordon.	Ditto.

By Death.

Bábu Sumbhoo Chunder Roy.	Rungpore.
Mahárajah Narendra Nárain Bhupa.	Cooch Behar.
Dr. J. Browne.	Calcutta.

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For February, 1864.

The monthly general meeting of the Asiatic Society was held on the 3rd instant.

A. Grote, Esq., senior member, in the chair.

The proceedings of the last meeting were read and confirmed.

The Chairman informed the Society that the accounts not having been returned by the auditors, it would be necessary to defer their submission to the Society's meeting for another month.

Presentations were received—

1. From H. M. Smith, Esq., a dead chicken with four legs.

2. From Lieutenant R. C. Beavan, specimens of an Albatross and a Tern from the South Seas.

3. From H. L. Haughton, Esq., specimens of four sea snakes from Hidgelli; also a white-breasted bat.

4. From Lieutenant-Colonel Tytler, four large slabs of wood carved with figures of Hindoo idols, from the palace of the Kaiser Bagh, Lucknow; also a box containing the skeleton of a mule.

The following extract from a letter which accompanied the presentation was read:—

"I got these slabs in the palace of the Kaiser Bagh, Lucknow, after the siege. They form a square, and all hook together. The only history I could gather about them was that it was a sort of portable place of pilgrimage representing the holy shrines in the Himalayas for the old, weak, and infirm, who could not undertake the pilgrimage to the real place; so they had to ascend the steps on this model and offer their offerings at each shrine, &c., presented in the carvings. I have also told Mr. Lazarus to give you for the Museum an old box containing a lot of old bones: it is the skeleton of a mule, *Equus onager*. I hope you will find him pretty perfect."

5. From Lieutenant Waterhouse, several photographs of archæological remains in Central India, to replace imperfect prints in the set presented to the Society some months ago.

The Chairman proposed, on the part of the Council, that the Right Hon'ble Sir John Lawrence should be requested to become the patron of the Society.

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Letters from Messrs. H. M. Rogers, J. Stephenson, and D. H. Macfarlane, announcing their withdrawal from the Society, were recorded.

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members :—

Hon'ble Sumbhoo Nath Pundit, Baboo Kaliprosonno Dutt, H. Leeds, Esq., A. M. Verchere, Esq., M. D., and Lieutenant A. Pullan.

The following gentlemen were named for ballot as ordinary members at the next meeting :—

H. R. Spearman, Esq , proposed by Mr. W. Theobald, Jr., seconded by Mr. Grote.

C. J. Wilkinson, Esq., barrister-at-law, proposed by Mr. H. F. Blanford, seconded by Mr. W. L. Heeley.

F. H. Pellew, Esq., C. S., proposed by Mr. Heeley, seconded by Mr. H. F. Blanford.

Baboo Jugodanund Mookerjee, proposed by Captain W. N. Lees, seconded by Baboo Rajendralal Mitra.

Lieutenant E. A. Trevor, H. M.'s Bengal Engineers, proposed by Mr. Grote, seconded by Mr. H. F. Blanford.

Dr. W. J. Palmer, proposed by Dr. Partridge, seconded by Dr. Fayrer.

Lieutenant G. M. Bowie, Madras Staff Corps, proposed by Mr. Geoghegan, seconded by Mr. Blanford.

The Council reported that they had appointed the following sub-committees for 1864 :—

FINANCE.

Lieutenant-Colonel H. Hyde and Baboo Rajendralal Mitra.

PHILOLOGY.

A. Grote, Esq., Captain W. N. Lees ; Baboo Rajendralal Mitra, and E. B. Cowell, Esq.

LIBRARY.

Captain W. N. Lees ; Baboo Rajendralal Mitra ; H. B. Medlicott, Esq.; Dr. T. Anderson ; H. Scott Smith, Esq. ; E. B. Cowell, Esq. ; T. Oldham, Esq. ; A. Grote, Esq. ; and Hon'ble L. S. Jackson.

NATURAL HISTORY.

Dr. T. Anderson ; A. Grote, Esq. ; Dr. A. C. Macrae ; Dr. J. Fayrer ; Dr. T. C. Jerdon ; T. Oldham, Esq. ; W. S. Atkinson, Esq. ;

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W. Theobald, Esq., Jr.; Dr. S. B. Partridge; H. B. Medlicott, Esq.; and Dr. F. Stoliczka,

METEOROLOGY AND PHYSICAL SCIENCE.

The Ven'ble J. H. Pratt; T. Oldham, Esq.; J. Obbard, Esq.; Colonel R. Strachey; Lieutenant-Colonel J. E. Gastrell; Lieutenant-Colonel J. T. Walker; Captain T. G. Montgomerie; H. Leonard, Esq.; and H. Scott Smith, Esq.

COIN COMMITTEE.

A. Grote, Esq.; Captain W. N. Lees; and Baboo Rajendralal Mitra.

COMMITTEE OF PAPERS.

Colonel R. Strachey; A. Grote, Esq.; and E. B. Cowell, Esq.

The Secretary read the following letter from Mr. Bowring forwarding copy of an inscription found in the hands of some Brahmins of Anantpore, a village in Mysore:—

"I send you a copy of a *sashana* or inscription on copper, which I found in the hands of some Brahmins of a village in the jungles of Anantpore about four miles N. E. of the Kusba. I copied the first bit myself, and left the *sashana* with the tehseeldar, with a view to his getting the rest copied, which he did; but I cannot say whether it is quite correct, as I did not see the copier and was obliged to leave before he made his appearance. The deed may be of interest.

"I have seen a vast number of inscriptions on stone slabs, but I believe the whole of these were copied by Walter Elliot. They are all in old Canarese, and I have not seen one in Sanskrit, except one illegible inscription at Banawasi."

Communications were received—

1. From Baboo Gopeenauth Sen, abstracts of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office in November last.

2. From Baboo Rajendralal Mitra, a paper on the Buddhist remains of Sultangunge.

Mr. Blanford read extracts from a paper by W. Theobald, Jr., Esq., entitled "Notes on the variation of some Indian and Burmese Helicidæ," and made some remarks on the subject of it.

Mr. Heeley also read extracts from a paper by Dr. J. E. T. Aitchison, on "The Vegetation of the Jhelum District of the Punjab."

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The paper having been read, a discussion ensued, in which Dr. Brandis, Colonel Strachey, and Mr. Heeley took part. The papers will appear in the Journal in due course.

The Librarian submitted his report of the accessions to the library since the meeting held in October.

Library.

The undermentioned books have been added to the Library since the meeting held in October last.

Presented.

The Annual Report of the Geological Survey of India, for 1862-63.—By the Bengal Government.

The Annual Report on the operations of the Post Office of India, for 1862-63.—By the Same.

Annual Report on the Administration of the Bengal Presidency, for 1862-63.—By the Same.

Annual Report on the Administration of the Punjab Territories, for 1862-63.—By the Same.

Annual Report on the Administration of the Province of Oudh, for the year 1862-63.—By the Same.

Annual Report on the Administration of the Central Provinces for the year 1862-63.—By the Same.

Annual Report on the Administration of the Straits Settlement, for 1862-63.—By the Same.

Annual Report of the Branch of the Marine Department, under control of the Govt. of India, for 1862-63.—By the Same.

Beretning sundhedstilstanden og medicinal forholdene i Norge, I Aaret, 1859.—By the Christiania University.

Bombay Magnetical and Meteorological Observations for 1862.—By the Bombay Government.

Bijdragen tot de Taal-Land-en Volkenkunde van Nederlandsch Indie, Vol. VI. Stuk 7, and Vol. VII. Stuk 1.—By the Copenhagen Society.

Boeck's Recherches sur la Syphilis.—By the Christiania University.

The Calcutta Christian Observer for October, November, December and January.—By the Editor.

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Cole's Manual of the Mohammedan Civil Law.—By the Translator.

Forhandlinger Videnskabs—Selskabet i Christiania Aar 1861.—By the Christiania University.

Fay's om Indvirkungen af Forskjellje.—By the Same.

On the Formation and Institution of the Caste system in India,—the Aryan polity.—By Babu Ganendro Mohun Tagore.

Geologiske Undersogelser Bergens Omegu.—By the Christiania University.

Generalberetning Fra Ganstad, 1861.—By the Same.

Holmboe om den Nordisk.—By the Same.

Ditto om Oprindelsen af det Skandinaviske Vœgtsystem i Middelalderen.—By the Same.

Hardy's Sacred books of the Buddhists compared with History and Modern Science.—By Rev. J. Nicholson.

Journal of the Chemical Society of London, 2nd Series, Vol. I. Nos. 7 to 9.—By the Society.

Journal of Sacred Literature and Biblical Record, New Series, No. 7.—By the Editors.

Reise der Novara um die Erde. Nautisch-physical Theil. II. Abth. —By the Trieste Academy.

Ethnographic Map of Finmark Nos. 1 to 5, with an explanatory table.— By the Christiania University.

Map of Kafiristan.—By the Surveyor General of India.

Index Map to Trigonometrical Survey Maps.—By the Same.

Mahábhárata, Ádi and Sabhá parvas text and Bengali translation.—By the Maháraja of Burdwan.

Memoirs of the Geological Survey of India, Vol. III Parts 1 and 2.—By the Government of India.

Ditto ditto Vol. III. Part 2.—By the Superintendent of the Geological Survey of India.

Meteorologische Beobachtungen auf Christiania's Observatorium for 1842-47.—By the Christiania University.

Memoires de la Societe Imperiales des Sciences Naturelles de Cherbourgh, Vol. VI.—By the Societe` de Cherbourgh.

Murdoch's Indian Year-Book for 1862.—By the Compiler.

Narrative of the Course of Legislation for 1862-63 —By the Bengal Government.

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Oriental Baptist for August 1863, Vol. XVII. No. 200.—By the Editor.

Proceedings of the Royal Geographical Society of London, Vol. VII. Nos. 4 and 5.—By the Society.

Report of the Committee of the Bengal Chamber of Commerce from 1st May to 31st October, 1863.—By the Chamber of Commerce.

Annual Report on the Administration of British Burmah, for 1862-63.—By the Bengal Government.

Report on the Police of the Town of Calcutta and its Suburbs for 1862-63.—By the Same.

Report on the Administration of the Madras Presidency during the year 1862-63.—By the Same.

Revue Orientale et Americaine, No 47.—By the Paris Ethnographical Society.

Report on the Administration of the N. W. Provinces, for 1862-63.—By the Bengal Government.

Report on the Hyderabad Assigned Districts for 1862-63.—By the Same.

Report on the Trade and Resources of the countries on the North West boundary of British India, with a Minute by Sir Robert Montgomery.—By the Government of India.

Reisen im Süden Von Ost-Sibirien, Band I.—By the Societe' Geographique Impe'riale de Russie.

Rahasya Sandarbha, Vol. I. Nos. 7 to 9.—By the School Book Society.

Selections from the Records of the Government, N. W. Provinces, No. 39.—By the Government, N. W. P.

Ditto ditto Bengal Government, No. 40.—By the Bengal Government.

Statement of the weekly Metl. Returns in the districts of the N. W. Provinces from 1st June, 1862, to 31st May, 1863.—By the Govt. N. W. Provinces.

A Manual of Jail Discipline and Economy.—By S. Clark, Esq.—By the Same.

Stray Leaves; or Essays, Poems and Tales.—By Shoshee Chunder Dutt.—By the Author.

Schubeler's Synopsis of the vegetable products of Norway, translated into English by Rev. M. R. Barnard.—By the Christiania University.

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Sar's Beskrivelse over Lophogaster Typicus.—By the Same.

Schubeler's Die Cultupflunzen Norwegens.—By the Same

Selections from the Records of the Madras Government, Nos. 73 to 75.—By the Madras Government.

Ditto ditto Nos. 73 and 74.—By the Bengal Government

Treaties, Engagements and Sunnuds, India, Vol. III.—By the Bengal Government.

Tabeller over de spedalske i Norge, I Aaret, 1860.—By the Christiania University.

Tabeller vedkommende Norges Handel og skibsfart, I, Aaret, 1860. —By the Same.

Viváda Chintámani.—By Babu Prosonno Coomar Tagore.

Wood's Statistics of the Trade of the Port of Calcutta, 1863.—By the Compiler.

Zeitschrift der Deutschen Morgenlandischen Gesellschaft, Vol. XVII. Part 3.—By the Academy.

Sáswí and Punhú, a Sindi poem with a metrical Translation into English.—By the Bombay Government.

Aitareya Brahmana, Vols. I. and II.—By the Same.

Natural History of New York,—Palæontology, by James Hall, with plates.—By the Regents of the New York State Library.

Ditto ditto—Agriculture by Emmas.—By the Same.

Annaler for Nordisk Oldkyndighed.—By the Copenhagen Antiquarian Society.

Antiquarisk Tidsskrift.—By the Same.

Solar Eclipse of July 18th, 1860, by W. de la Rue, Esq.—By the Royal Society of London.

Address to the Natives of Hindoostan on Education, by Syud Ahmad Khan.—By the Ghazeepore Scientific Society.

Bye-Laws for the Scientific Society of Ghazeepore.—By the Same.

Proceedings No. I. of the Scientific Society, Ghazeepore.—By the Same.

Address of the President of the Linnean Society, May 24th, 1862. —By the Society.

List of the Linnean Society for 1862.—By the Same.

Annals of Indian Administration, Vol. VII. Part 4.—By the Bengal Government.

Weber's Indische Studien, Vol VII. Parts 1 and 2.—By the Editor.

Quarterly Journal of the Geological Society of London, Vol. XIX. Part 4.—By the Society

Journal of the Statistical Society of London, Vol. XXVI. Part 3.—By the Society.

Journal of the Agricultural and Horticultural Society of India, Vol. XIII. Part 1.—By the Society.

Jahrbuch der K. K. Geol. Reichsanstalt, Vol. XIII. No. 2.—By the Society.

Journal Asiatique, Sixieme Series, Vol. I. No. 3.—By the Paris Society.

Proceedings of the Royal Society of London, Vol. XIII. No. 57.—By the Society.

Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, from 14th May, 1862 to 17th May, 1863.—By the Royal Observatory.

Transactions of the Linnean Society of London, Vol. XXIII. Parts 1 to 3, and Vol. XXIV. Part 1.—By the Linnean Society.

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LÁLGOPÁL DUTT.

3rd February, 1864.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.559	29.601	29.524	0.077	83.4	89.6	80.0	9.6
2	*Sunday.*							
3	.490	.546	.434	.112	81.5	84.7	78.4	6.3
4	.483	.521	.443	.078	81.8	83.8	80.0	3.8
5	.534	.574	.490	.084	82.4	86.8	78.8	8.0
6	.548	.589	.498	.091	82.7	85.4	79.8	5.6
7	.529	.564	.465	.099	84.3	90.2	80.0	10.2
8	.528	.578	.464	.114	85.4	90.3	82.2	8.1
9	*Sunday.*							
10	.487	.531	.402	.129	83.7	89.6	81.0	8.6
11	.458	.515	.388	.127	82.7	86.5	80.2	6.3
12	.442	.490	.392	.098	82.9	87.3	81.0	6.3
13	.482	.553	.436	.117	83.1	87.8	80.0	7.8
14	.523	.575	.459	.116	84.0	89.6	80.0	9.6
15	.498	.550	.417	.133	84.9	90.6	80.8	9.8
16	*Sunday.*							
17	.407	.467	.350	.117	81.4	85.2	79.8	5.4
18	.500	.591	.439	.152	80.5	84.4	78.2	6.2
19	.593	.647	.550	.097	82.1	87.4	79.6	7.8
20	.601	.648	.539	.109	84.5	88.8	81.6	7.2
21	.564	.603	.501	.102	84.1	86.8	81.9	4.9
22	.549	.596	.491	.105	81.5	85.8	78.2	7.6
23	*Sunday.*							
24	.631	.699	.563	.136	82.4	88.8	79.7	9.1
25	.665	.713	.618	.095	80.7	86.2	75.4	10.8
26	.678	.728	.641	.087	81.4	84.3	78.0	6.3
27	.704	.746	.659	.087	81.4	86.8	78.8	8.0
28	.678	.735	.598	.137	83.2	88.6	78.6	10.0
29	.649	.707	.587	.120	83.2	87.8	80.8	7.0
30	*Sunday.*							
31	.634	.687	577	.110	82.8	87.0	81.3	5.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79.4	4.0	76.6	6.8	0.899	9.63	2.33	0.81
2	*Sunday.*							
3	78.7	2.8	76.7	4.8	.902	.70	1 61	.86
4	79.2	2.6	77.4	4.4	.922	.93	.47	.87
5	79.3	3.1	77.1	5.3	.913	.82	.79	.85
6	79.7	3.0	77.6	5.1	.928	.97	.75	.85
7	80.5	3.8	77.8	6.5	.934	.99	2.29	.81
8	80.7	4.7	77.4	8.0	.922	.85	.83	.78
9	*Sunday.*							
10	80.1	3.6	77.6	6.1	.928	.95	.12	.82
11	79.4	3.3	77.1	5.6	.913	.80	1.92	.84
12	79.5	3.4	77.1	5.8	.913	.80	.99	.83
13	80.0	3.1	77.8	5.3	.934	10.03	.83	.85
14	80.3	3.7	77.7	6 3	.931	9.98	2.19	.82
15	80.8	4.1	77.9	7.0	.937	10.02	.47	.80
16	*Sunday.*							
17	79.0	2.4	77.3	4.1	.919	9.90	1.37	.88
18	78.5	2.0	77.1	3.4	.913	.86	.12	.90
19	79.7	2.4	78.0	4.1	.940	10.11	.40	.88
20	80.9	3.6	78.4	6.1	.952	.19	2.16	.83
21	80.6	3.5	78.1	6.0	.943	.10	.11	.83
22	78.7	2.8	76.7	4.8	.902	9.70	1.61	.86
23	*Sunday.*							
24	79.4	3.0	77.3	5.1	.919	.88	.73	.85
25	78.0	2.7	76.1	4.6	.885	.53	.51	.86
26	78.7	2.7	76.8	4.6	.905	.73	.54	.86
27	79.0	2.4	77.3	4.1	.919	.90	.37	.88
28	80.3	2.9	78.3	4.9	.949	10.18	.71	.86
29	80.7	2.5	78.9	4.3	.967	.39	.50	.87
30	*Sunday.*							
31	80.3	2.5	78.5	4.3	.955	.27	.48	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-point.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29.565	29.715	29.415	0.300	81.3	83.6	79.2	4.4
1	.551	.712	.387	.325	81.0	82.8	78.4	4.4
2	.541	.706	.362	.344	80.9	83.0	78.6	4.4
3	.536	.688	.354	.334	80.7	83.2	78.4	4.8
4	.540	.679	.424	.255	80.7	82.8	78 0	4.8
5	.535	.688	.350	.338	80.5	82.3	75.4	6.9
6	.553	.698	.366	.332	80.6	82.2	76.0	6.2
7	.567	.723	.382	.341	80.9	82 6	76.0	6.6
8	.590	.729	.458	.271	82.2	84.4	76.7	7.7
9	.594	.741	.407	.334	83.2	86.2	77.2	9.0
10	.594	.746	.418	.328	84.2	87.2	78.4	8.8
11	.589	.743	.423	.320	85.0	88.8	79.4	9.4
Noon.	.578	.730	.424	.306	85.6	89.6	79.8	9.8
1	.560	.719	.432	.287	85.7	89.6	80.6	9.0
2	.537	.697	.401	.296	85.3	90.3	79.8	10.5
3	.518	.674	.396	.278	85.1	90.6	80.6	10.0
4	.504	.659	.378	.281	84.9	90.0	80.3	9.7
5	.511	.669	.392	.277	84.5	88.2	81.2	7.0
6	.518	.694	.390	.304	83.5	86.8	80.6	6.2
7	.535	.681	.418	.263	82.6	85.6	78.2	7.4
8	.555	.691	.439	.252	82.2	85.0	78.4	6.6
9	.571	.719	.454	.265	82.1	84.8	79.0	5.8
10	.583	.724	.464	.260	81.9	84.0	78.8	5 2
11	.581	.721	.454	.267	81.6	84.6	78.8	5.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.1	2.2	77.6	3.7	0.928	9.99	1.25	0.89
1	78.9	2.1	77.4	3.6	.922	.93	.21	.89
2	78.8	2.1	77.3	3.6	.919	.90	.20	.89
3	78.7	2.0	77.3	3.4	.919	.92	.12	.90
4	78.8	1.9	77.5	3.2	.925	.98	.06	.90
5	78.5	2.0	77.1	3.4	.913	.86	.12	.90
6	78.6	2.0	77.2	3.4	.916	.89	.12	.90
7	78.9	2.0	77.5	3.4	.925	.98	.12	.90
8	79.3	2.9	77.3	4.9	.919	.88	.66	.86
9	79.7	3.5	77.2	6.0	.916	.83	2.06	.83
10	80.3	3.9	77.6	6.6	.928	.93	.31	.81
11	80.6	4.4	77.5	7.5	.925	.88	.65	.79
Noon.	80.6	5.0	77.1	8.5	.913	.74	3.02	.76
1	80.9	4.8	77.5	8.2	.925	.88	2.92	.77
2	80.6	4.7	77.3	8.0	.919	.82	.82	.78
3	80.7	4.4	77.6	7.5	.928	.91	.66	.79
4	80.7	4.2	77.8	7.1	.934	.99	.50	.80
5	80.5	4.0	77.7	6.8	.931	.96	.39	.81
6	80.3	3.2	78.1	5.4	.943	10.12	1.88	.84
7	79.9	2.7	78.0	4.6	.940	.09	.59	.86
8	79.7	2.5	77.9	4.3	.937	.08	.46	.87
9	79.6	2.5	77.8	4.3	.934	.05	.46	.87
10	79.4	2.5	77.6	4.3	.928	9.99	.45	.87
11	79.2	2.4	77.5	4.1	.925	.96	.38	.88

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for Computing Dew-point.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	°	Inches.		lb	
1	131.0	0.14	S. W. & S. E.	...	Cloudy; also drizzling from 4 to 8 P. M.; and also at 11 P. M.
2	...	...	*Sunday.*	...	
3	...	1.90	W. & S. W.	½	Cloudy; also incessantly raining from 1 A. M. to Noon.
4	...	...	S. & S. W.	½	Cloudy also slightly drizzling between 8 & 10 A. M. and at 3 & 4 P. M.
5	...	0.76	S. & E.	¾	Cloudy till 7 P. M. cloudless afterwards; also raining from 1 to 3 A. M. and between 10 and 11 A. M.
6	...	0.08	S. & S. E.	¾	Cloudless till 5 A. M.; cloudy till 6 P. M. cloudless afterwards; also drizzling occasionally from 6 A. M. to 1 P. M.
7	126 0	...	S. E. & S.	1	Cloudless till 4 A. M. cloudy afterwards; also slightly drizzling at 8 A. M. Noon, and 9 P. M.
8	123.2	...	S. & S. E.	1	Cloudy till 10 A. M. Scatd. ⌒i till 7 P. M.; cloudless afterwards.
9	...	0.86	*Sunday.*	1	
10	119.0	...	S. E.	3	Cloudy; also very slightly drizzling after intervals.
11	...	0.17	E. & S. E.	2¾	Cloudless till 6 A. M. cloudy afterwards; and thundering at 2 P. M.; also drizzling at Noon & between 1 & 2 P. M.
12	...	0.50	E. & N. E.	3¼	Cloudy; and thundering at 1 P. M.; also raining between 10 & 11 A. M.; & at 1 & 5 P. M.
13	115.0	0.50	E.	2	Cloudless till 5 A. M.; cloudy till 4 P. M. cloudless afterwards; & thundering at Noon, also raining between 10 & 11 A. M. and at 3 & 4 P. M.
14	122.4	...	E. & S. E.	1¾	Cloudless till 6 A. M. Scatd. ⌒i till 11 A. M. Scatd. clouds till 8 P. M. cloudless afterwards; also thundering at Noon.
15	124.0	0.09	E.	4	Cloudless till 5 A. M. Scatd. ⌒i till 7 P. M. cloudless afterwards; also drizzling between 3 & 4 A. M. & 11 & Noon & 5 & 6 P. M.
16	...	...	*Sunday.*	2½	
17	...	1.43	S.	3¼	Cloudy; also raining after intervals.
18	...	1.93	S. & S. E.	2	Cloudy till 8 P. M.; cloudless afterwards; also incessantly raining from 1 A. M. to Noon.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches			
19	...	0.30	S. & S. E.	2¾	Cloudless till 3 A. M. cloudy till 7 P. M.; cloudless afterwards, also raining at 4, 5, 7, 9, & 11 A. M.
20	122.0	...	S. & S. E.	4¼	Cloudless till 5 A. M. Scatd. ⌒i & ⌒i till 1 P. M. cloudy afterwards; with thunder at 6 P. M. also slightly drizzling at 7 P. M.
21	...	...	S. & W.	1	Cloudy; with thunder & lightning at Midnight; also drizzling at 1 A. M. and from 9 P. M. to 11 P M.
22	...	3.50	W. & S.	3¼	Cloudy; also constantly drizzling and raining.
23	...	...	*Sunday.*	1¼	
24	...	0.24	S. E. & Calm.	3½	Cloudy; also raining from 2 P. M. to 4 P. M.
25	...	0.41	S. E. & S.	2¼	Cloudy; also raining from 5 to 10 A. M.
26	...	0.12	S. & S. E.	1¾	Cloudy, also drizzling between 5 & 6 A. M. at 9 & 10 A. M. & between 2 & 3 P. M.
27	...	0.19	S.	4	Scatd. ⌒i till 8 A. M. cloudy till 7 P. M. Scatd. ⌒i afterwards; also drizzling from 11 A. M. to 3 P. M.
28	128.0	...	S. & S. E.	2¼	Scatd. clouds.
29	...	0.74	S. & S. E. & S. W.	1¾	Scatd. ⌒i till 7 A. M. cloudy till 7 P. M. cloudless afterwards; also raining between 10 & 11 A. M. at 1, 3 & 4 P. M.
30	...	...	*Sunday.*	1½	
31	...	0.24	S. & E.	1½	Cloudy, also drizzling at 7 A. M. and from 1 to 3 P. M.

⌒i Cirri, ⌒i Cirro strati, ⌒i Cumuli, ⌒i Cumulo strati, ⌒i Nimbi, —i Strati, ⌒i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.555
Max. height of the Barometer occurred at 10 A. M. on the 27th, ..	29.746
Min. height of the Barometer occurred at 5 A. M. on the 17th, ..	29.350
Extreme range of the Barometer during the month, ...	0.396
Mean of the daily Max. Pressures, ...	29.606
Ditto ditto Min. ditto, ...	29.497
Mean daily range of the Barometer during the month, ...	0.109

	°
Mean Dry Bulb Thermometer for the month, ...	82.8
Max. Temperature occurred at 3 P. M. on the 15th, ...	90.6
Min. Temperature occurred at 5 A. M. on the 25th, ...	75.4
Extreme range of the Temperature during the month, ...	15.2
Mean of the daily Max. Temperature, ...	87.3
Ditto ditto Min. ditto, ...	79.8
Mean daily range of the Temperature during the month, ..	7.5

	°
Mean Wet Bulb Thermometer for the month, ...	79.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	3.1
Computed Mean Dew-point for the month, ...	77.5
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	5.3
	Inches
Mean Elastic force of Vapour for the month, ...	0.925

	Troy grains
Mean Weight of Vapour for the month, ...	9.94
Additional Weight of Vapour required for complete saturation, ..	1.81
Mean degree of humidity for the month, complete saturation being unity,	0.85

	Inches
Rained 24 days, Max. fall of rain during 24 hours, ...	3.50
Total amount of rain during the month, ...	14.10
Prevailing direction of the Wind, ...	S. & S. E. & E.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1863.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.					5		7		10				1	1					3
1					5		8		9	3	2	1	1	1			1		
2					6	1	8	1	8	1	2	1	1	1			1		
3					5	1	8		8	1	2	1	1	1			1		1
4					4	1	7	1	7	1	2	1	1	1			1		4
5	1				5		4	1	8	2	3	1	1	1			1		3
6	1				5		5		10	3	3	1	2	2					
7			3	1	5		4	1	9	3	3	1	2	1					
8	1				6		1	1	9	1	3		5	2					1
9					8	1	2	1	8	3	2	1	6	2					
10			1		7	1	1	1	9	2	3	1	5	1					
11			2		6	3	1		7	1	4	2	6	2					
Noon.			3		3	2	4	1	7	3	4	1	3	1	2				
1	1	1			6	1	5	1	5	2	4		4		1				
2			1	1	4	1	9	2	6	2	4	1	2						
3			2	1	5	1	3	1	9	3	4		3	2					
4			1	1	3	1	8	1	9	2	3	2	2						
5			1	1	2		6		12		2		1						2
6			1		1		7	2	13	2	1		3						
7	1		1		3		6	1	11	1	2		2	1					
8			1		4		6	1	11		1		1	1			2		
9			1		4		6		10	2	1		1	1			2		1
10			1		3		7		10	2	1		1				2		1
11			1		3		7	1	11	1	1		1	1			2		

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.606	29.662	29.530	0.132	83.3	87.5	80.2	7.3
2	.625	.682	.572	.110	82.9	86.0	80.6	5.4
3	.677	.736	.624	.112	83.8	89.0	78 8	10.2
4	.669	.750	.583	.167	84.7	90 6	80.8	9.8
5	.648	.690	.593	.097	82.2	88.6	78.4	10.2
6	*Sunday.*							
7	.691	.754	.619	.135	83 5	89.6	79.8	9.8
8	.704	.769	.632	.137	84.3	90.3	80.2	10.1
9	.677	.746	.598	.148	83.5	88.5	80 6	7.9
10	.638	.702	.564	.138	82.9	86.6	80.2	6.4
11	.652	.713	.587	.126	82.3	87.5	80.0	7.5
12	.693	.758	.648	.110	80.9	85.2	79.0	6.2
13	*Sunday*							
14	.616	.701	.536	.165	81.7	85.1	77.8	7.3
15	.546	.596	.482	.114	83.7	88.4	80.2	8.2
16	.544	.590	.482	.108	83.5	87.8	80.6	7.2
17	.597	.653	.552	.101	83 0	86.8	80.4	6.4
18	.671	.729	.611	.118	83.1	87.2	80.6	6.6
19	.707	.778	.655	.123	83.3	88.7	80.0	8.7
20	*Sunday.*							
21	.640	.694	.557	.137	81.9	89.3	78.7	10.6
22	.619	.674	.554	.120	80.8	86.6	78.4	8.2
23	.626	.669	.558	.111	80.3	82.2	78.3	3.9
24	.616	.666	.550	.116	80.0	82.7	78.8	3.9
25	.607	.670	.550	.120	80.1	82.6	79.0	3.6
26	.659	.732	.599	.133	83.3	88.5	79.5	9.0
27	*Sunday.*							
28	.686	.750	.618	.132	84.4	89.0	80.2	8.8
29	.657	.718	.592	.126	84.6	88.8	81.6	7.2
30	.648	.698	.599	.099	82.7	85.3	78.0	7.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.1	3.2	77.9	5.4	0.937	10.06	1.87	0.84
2	79.8	3.1	77.6	5 3	.928	9.97	.82	.85
3	79.8	4.0	77.0	6.8	.910	.75	2.35	.81
4	80 2	4.5	77.0	7.7	.910	.73	.69	.78
5	78.9	3.3	76.6	5.6	.899	.65	1.89	.84
6	*Sunday.*							
7	79.8	3.7	77.2	6.3	.916	.83	2.17	.82
8	80 3	4.0	77.5	6.8	.925	.90	.38	.81
9	79.9	3.6	77.4	6.1	.922	.89	.11	.82
10	79.6	3 3	77.3	5.6	.919	.86	1.93	.84
11	79.4	2.9	77.4	4.9	.922	.91	.67	.86
12	78.9	2.0	77.5	3.4	.925	.98	.12	.90
13	*Sunday.*							
14	79.6	2.1	78.1	3 6	.943	10.14	.23	.89
15	80.5	3.2	78.3	5.4	.919	.18	.89	.84
16	80.6	2.9	78.6	4 9	.958	.28	.72	.86
17	80.1	2.9	78.1	4·9	.943	.12	.70	.86
18	80 0	3.1	77.8	5.3	.934	.03	.83	.85
19	80.1	3.2	77.9	5 4	.937	.06	.87	.84
20	*Sunday.*							
21	78.9	3.0	76.8	5.1	.905	9.73	.71	.85
22	78.3	2.5	76.5	4.3	.896	.67	.40	.87
23	77.6	2.7	75 7	4.6	.873	.41	.50	.86
24	77.9	2 1	76.4	3.6	.893	.64	.17	.89
25	78.3	1.8	77.0	3.1	.910	.83	.01	.91
26	79.6	3.7	77.0	6.3	.910	.77	2.16	.82
27	*Sunday.*							
28	80 6	3.8	77.9	6.5	.937	10.02	.29	.81
29	81.1	3.5	78.6	6.0	.958	.26	.13	.83
30	80.3	2.4	78.6	4.1	.958	.30	1.42	.88

All the Hygrometrical elements are computed by the Greenwich Constants.

From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.654	29.721	29.558	0.163	81.2	83.0	79.0	4.0
1	.644	.714	.552	.162	81.0	82.8	78.8	4.0
2	.633	.711	.539	.172	80.7	82.6	78.8	3.8
3	.621	.702	.531	.171	80.6	82.4	78.2	4.2
4	.620	.687	.522	.165	80.3	81.8	77.8	4.0
5	.629	.701	.520	.181	80.2	82.8	78.4	4.4
6	.644	.722	.530	.192	80.2	82.8	78.3	4.5
7	.660	.743	.539	.204	80.9	83.4	79 4	4.0
8	.683	.758	.573	.185	82.9	84.5	79.9	4.6
9	.695	.778	.590	.188	83.8	85.8	80.6	5.2
10	.698	.772	.583	.189	85.0	87.6	80.4	7.2
11	.685	.754	.576	.178	86.0	88.4	80.8	7.6
Noon.	.667	.735	.561	.174	86.2	89.3	80.7	8.6
1	.638	.720	.528	.192	85.4	89.6	79.1	10.5
2	.614	.688	.506	.182	85.1	90.6	78.7	11.9
3	.594	.683	.482	.201	84.9	90.3	78.4	11.9
4	.582	.676	.482	.194	84.8	89.5	79.6	9.9
5	.590	.663	.488	.175	83.6	87.4	79.9	7.5
6	.602	.669	.482	.187	82.9	86.2	79.4	6.8
7	.623	.689	.534	.155	82.4	85.4	79.6	5.8
8	.647	.708	.552	.156	82.0	84.8	79.2	5.6
9	.664	.729	.565	.164	81.8	84 2	79.4	4.8
10	.670	.729	.570	.159	81.4	83.8	78 6	5.2
11	.664	.727	.562	.165	81.2	83.6	78.0	5.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.1	2.1	77.6	3.6	0.928	9.99	1.22	0.89
1	79.0	2.0	77.6	3.4	.928	10.01	.13	.90
2	78.8	1.9	77.5	3.2	.925	9.98	.06	.90
3	78.7	1.9	77.4	3.2	.922	.95	.06	.90
4	78.6	1.7	77.4	2.9	.922	.95	0.96	.91
5	78.6	1.6	77.5	2.7	.925	.98	.90	.92
6	78.6	1.6	77.5	2.7	.925	.98	.90	.92
7	79.1	1.8	77.8	3.1	.934	10.07	1.03	.91
8	79.9	3.0	77.8	5.1	.934	.03	.76	.85
9	80.3	3.5	77.8	6.0	.934	.01	2.09	.83
10	80.6	4.4	77.5	7.5	.925	9.88	.65	.79
11	80.7	5.3	77.0	9.0	.910	.71	3.20	.75
Noon.	80.7	5.5	76.8	9.4	.905	.65	.34	.74
1	80.4	5.0	76.9	8.5	.908	.68	.00	.76
2	80.2	4.9	76.8	8.3	.905	.67	2.90	.77
3	80.3	4.6	77.1	7.8	.913	.76	.73	.78
4	80.3	4.5	77.1	7.7	.913	.76	.70	.78
5	79.9	3.7	77.3	6.3	.919	.86	.17	.82
6	79.8	3.1	77.6	5.3	.928	.97	1.82	.85
7	79.7	2.7	77.8	4.6	.934	10.03	.58	.86
8	79.5	2.5	77.7	4.3	.931	.02	.45	.87
9	79.4	2.4	77.7	4.1	.931	.02	.38	.88
10	79.1	2.3	77.5	3.9	.925	9.96	.31	.88
11	79.1	2.1	77.6	3.6	.928	.99	.22	.89

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches		lh	
1	...	...	S.	1½	Scatd. ⌙i till 4 A. M.; cloudy till 6 P. M.; cloudless afterwards.
2	...	0.19	S. & S. E.	4	Cloudy till 5 A. M.; Scatd. ⌙i till 10 A. M.; cloudy till 4 P. M. Scatd. ⌙i afterwards; also raining between Noon & 1 P. M.
3	127.8	0.10	S. & S. E. & S. W.	2¼	Scatd. ⌙i & ⌒i till 2 P. M. cloudy afterwards; also raining between 4 & 5 A. M.
4	135.5	...	S. & S. E.	1¾	Cloudy till 2 A. M. Scatd. ⌙i & ⌒i till 2 P. M.; Scatd. clouds afterwards.
5	120.0	0.30	S. E. & E. & S.	4	Scatd. clouds till 8 A. M.; cloudy till 3 P. M.; cloudless afterwards; also raining between 1 and 2 P. M. and at 3 P. M.
6	...	0.32	*Sunday.*	1¾	
7	130.0	0.46	S. & S. E.	3	Cloudless till 7 A. M. Scatd. ⌙i & ⌒i till 2 P. M.,; cloudy afterwards; also occasionlly raining from 2 to 7 P. M.
8	135.5	...	E. & S. E. & S.	2	Cloudless till 5 A. M. Scatd. ⌙i and ⌒i till 6 P. M. cloudless afterwards.
9	129.5	0.54	S. & S. E. & E.	2½	Cloudless till 6 A. M. Scatd. ⌙i & ⌒i till 5 P. M. cloudless afterwards; also raining at 2 & 3 P. M.
10	...	...	E. & S.	2¾	Cloudless till 5 A. M. cloudy till 6 P. M. cloudless afterwards; also very slightly drizzling between noon & 1 P. M.
11	...	...	S. E. & S.	2	Cloudless till 2 A. M. cloudy afterwards; also drizzling at 6 A. M.
12	...	0.21	S. E.	4¾	Cloudy; also constantly drizzling.
13	...	0.57	*Sunday.*	4¼	
14	...	0.28	S.	3	Cloudy till 4 P. M.; cloudless afterwards; also drizzling from midnight to 4 A. M.
15	...	...	S.	2½	Cloudy till 5 P. M. cloudless afterwards.
16	135.0	0.55	S. E. & S. W. & Calm	1¾	Cloudy; also raining at 5 A. M. and between 9 & 10 A. M.; and thundering and lightning between 10 & 11 P. M.
17	...	0.42	S.	1½	Cloudy; also raining at 3 A. M. & from 4 P. M. to 6 P. M.
18	...	0.10	E. & S. E.	8	Cloudy till 6 P. M.; cloudless afterwards; also drizzling between 11 & noon, at 2 P. M. & between 3 & 4 P. M.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches.		lb	
19	130.0	0.88	S. E. & N. W.	2¼	Cloudless till 7 A. M.; Scatd. clouds afterwards; also raining between noon and 1 P. M.; at 5 P. M. and between 8 and 9 P. M.
20	...	...	*Sunday.*	2¼	
21	134.9	1.10	S. E.	10	Cloudy; also raining from 1 to 3 P. M.
22	...	0.74	S. & N. E.	4	Scatd. ⌒i till 7 A. M.; cloudy afterwards; also raining from 2 to 7 P. M.
23	...	...	N. E. & E.	2¾	Cloudy; also drizzling at 3 A. M. and at 2 & 3 P. M.
24	...	0.40	E. & N. E & S. E.	5	Cloudy; also drizzling constantly.
25	...	0.44	E. & S. E.	3¾	Cloudy; also drizzling nearly the whole day.
26	130.2	...	S. E. & S.	3	Scatd. clouds till 7 A. M.; Scatd. ⌒i & ⌒i till 4 P. M. cloudless afterwards.
27	...	0.61	*Sunday.*	2	
28	133.5	...	E. & S. E.	2	Scatd. ⌒i & ⌒i.
29	127.2	...	E. & Variable.	2	Cloudy; also slightly drizzling at 8 P. M.
30	...	2.12	N. W. & S. E.	3	Cloudy; also raining between 11 and noon, and from 4 to 10 P. M.

⌒i Cirri, ⌒i Cirro strati, ⌒i Cumuli, ⌒i Cumulo strati, ⌒i Nimbi,—i Strati, ⌒ i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.643
Max. height of the Barometer occurred at 9 A. M. on the 19th, ..	29.778
Min. height of the Barometer occurred at 3 & 4 P. M. on the 16th, ..	29.482
Extreme range of the Barometer during the month, ...	0.296
Mean of the Daily Max. Pressures, ...	29.703
Ditto ditto Min. ditto, ...	29.579
Mean daily range of the Barometer during the month, ...	0.124

	°
Mean Dry Bulb Thermometer for the month, ...	82.7
Max. Temperature occurred at 2 P. M. on the 4th, ...	90.6
Min. Temperature occurred at 4 A. M. on the 14th, ...	77.8
Extreme range of the Temperature during the month, ...	12.8
Mean of the daily Max. Temperature, ...	87.2
Ditto ditto Min. ditto, ...	79.6
Mean daily range of the Temperature during the month, ...	7.6
Mean Wet Bulb Thermometer for the month, ...	79.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	3.1
Computed Mean Dew-point for the month, ...	77.4
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	5.3

	Inches
Mean Elastic force of Vapour for the month, ...	0.922

	Troy grains
Mean Weight of Vapour for the month, ...	9.91
Additional Weight of Vapour required for complete saturation, ..	1.81
Mean degree of humidity for the month, complete saturation being unity,	0.85

	Inches
Rained 23 days, Max. fall of rain during 24 hours, ...	2.12
Total amount of rain during the month, ...	10.33
Prevailing direction of the Wind, ...	S. & S. E. & E.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1863.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	1		3	1	5	1	6		10	1							1		
1	1		3		5	1	6		10	1							1		
2	1		3		4	1	8		10	1									
3			3	1	3	1	7		9	2									4
4			2		3		9		8	1									4
5			3		4		8	3	8				1						2
6			2		3		11	1	9				1						
7			2		4		9		9				1		1				
8			2		6	1	6		10		1				1				
9					10		4		10	1	1				1				
10					11	2	4		9	1			1		1				
11	1		1		9	1	6	1	6		2				1	1			
Noon.			3		4		10	1	4		4				1	1			
1	1		1		7	2	8	3	6		2	1			1				
2					9	4	8	4	5	1	2		1		1				
3			1	1	6	3	8	4	7	1	1		1		2				
4			2		4	1	9	3	7	1	2		1		1	1			
5	1	1	1		3	1	9		10	4	2								
6					4	1	10	1	9	2	2		1						
7			1		4	1	7	1	10	2	1				1		2		
8					5		8	1	10						1	1	2	1	
9	1		1		4	2	6		10						1	1	2		1
10	1		1		4	1	8	1	9		1				1		1		
11	1		1		4		9	1	8		1				1		1		

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.646	29.713	29.588	0.125	81.1	86.1	76.8	9.3
2	.668	.725	.602	.123	81.8	86.1	79.2	6.9
3	.678	.729	.617	.112	81.6	88.0	79.0	9.0
4	*Sunday.*							
5	.621	.673	.549	.124	80.0	82.4	78.6	3.8
6	.662	.730	.605	.125	79.9	84.5	78.0	6.5
7	.751	.807	.702	.105	81.5	86.0	77.4	8.6
8	.828	.895	.766	.129	82.2	88.0	77.4	10.6
9	.844	.923	.791	.132	82.5	88.5	78.2	10.3
10	.841	.917	.773	.144	83.1	88.2	77.8	10.4
11	*Sunday.*							
12	.841	.915	.803	.112	84.2	90.0	79.1	10.9
13	.858	.917	.797	.120	85.1	90.4	80.4	10.0
14	.842	.917	.783	.134	85.2	90.3	81.6	8.7
15	.849	.911	.791	.120	84.7	89.8	80.8	9.0
16	.874	.946	.822	.124	84.2	89.6	80.0	9.6
17	.834	.907	.774	.133	80.1	84.2	77.2	7.0
18	*Sunday.*							
19	.922	.981	.868	.113	81.1	86.8	76.2	10.6
20	.948	30.003	.904	.099	78 9	83.6	74.4	9 2
21	.949	.029	.892	.137	79.3	85.9	74.0	11.9
22	.908	29.976	.839	.137	79.4	86.6	73.2	13.4
23	.895	.981	.830	.151	79.3	86.6	72.2	14.4
24	.876	.945	.832	.113	79.8	86.9	72.4	14.5
25	*Sunday.*							
26	.797	.872	.723	.149	79.8	86 6	74.2	12.4
27	.739	.796	.667	.129	81.2	88.0	75.4	12.6
28	.767	.820	.722	.098	80.3	84.6	78.6	6.0
29	.813	.870	.749	.121	81.0	86.6	76.8	9.8
30	.860	.928	812	.116	79.9	84.7	76.0	8.7
31	.862	.931	.804	.127	77.9	83.4	73.2	10.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.1	3.0	76.0	5.1	0.882	9.50	1.67	0.85
2	79.3	2.5	77.5	4.3	.925	.96	.44	.87
3	78.9	2.7	77.0	4.6	.910	.79	.55	.86
4	*Sunday.*							
5	78.0	2.0	76.6	3.4	.899	.71	.10	.90
6	78.0	1.9	76.7	3.2	.902	.74	.04	.90
7	78.4	3.1	76.2	5.3	.887	.56	.75	.85
8	78.0	4.2	75.1	7.1	.857	.21	2.33	.80
9	78.0	4.5	74.8	7.7	.849	.11	.53	.78
10	78.1	5.0	74.6	8.5	.843	.03	.83	.76
11	*Sunday.*							
12	79.5	4.7	76.2	8.0	.887	.51	.73	.78
13	80.4	4.7	77.1	8.0	.913	.76	.81	.78
14	80.6	4.6	77.4	7.8	.922	.85	.76	.78
15	79.8	4.9	76.4	8.3	.893	.56	.86	.77
16	78.1	6.1	73.8	10.4	.822	8.80	3.44	.72
17	76.8	3.3	74.5	5.6	.840	9.07	1.77	.84
18	*Sunday.*							
19	75.1	6.0	70.9	10.2	.748	8.07	3.10	.72
20	73.1	5.8	69.0	9.9	.704	7.60	2.87	.73
21	73 0	6.3	68.6	10.7	.695	.50	3.09	.71
22	72.9	6.5	68.3	11.1	.688	.43	.19	.70
23	71.8	7 5	66.5	12.8	.648	.00	.59	.66
24	73.0	6.8	68.2	11.6	.686	.40	.35	.69
25	*Sunday.*							
26	74.4	5.4	70.6	9.2	.741	8.00	2.75	.74
27	76.2	5.0	72.7	8.5	.792	.52	.69	.76
28	77.4	2.9	75.4	4.9	.865	9.34	1.57	.86
29	76.1	4.9	72.7	8.3	.792	8.54	2.60	.77
30	73.7	6.2	69.4	10.5	.713	7.69	3.09	.71
31	69.6	8.3	63.8	14.1	.593	6.42	.74	.63

All the Hygrometrical elements are computed by the Greenwich Constants.

From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-point.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Midnight.	29.819	29.949	29.638	0.311	78.9	82.6	75.0	7.6
1	.803	.942	.617	.325	78.5	82.4	74.2	8.2
2	.795	.928	.609	.319	78.2	82.8	74.4	8.4
3	.791	.926	.596	.330	78.0	82.4	74.4	8.0
4	.785	.934	.588	.346	77.2	82.2	72.6	9.6
5	.786	.920	.596	.324	77.9	82.0	72.2	9.8
6	.820	.965	.608	.357	77.2	81.6	72.4	9.2
7	.839	.982	.633	.349	78.0	82.6	72.4	10.2
8	.862	30.015	.661	.354	80.3	84.6	76.3	8.3
9	.875	.029	.660	.369	81.8	86.4	77.6	8.8
10	.875	.027	.673	.354	83.1	87.4	79.4	8.0
11	.858	29.998	.651	.347	84.3	88.4	79.0	9.4
Noon.	.834	.980	.627	.353	85.3	89.6	79.9	9.7
1	.805	.956	.606	.350	85.5	90.3	80.4	9.9
2	.781	.935	.575	.360	85.4	90.4	78.8	11.6
3	.765	.919	.553	.366	85.8	90.1	79.0	11.1
4	.766	.904	.549	.355	85.4	90.3	79.4	10.9
5	.768	.922	.563	.359	83.9	88.8	79.8	9.0
6	.779	.928	.586	.342	82.6	87.0	78.8	8.2
7	.797	.950	.610	.340	81.5	86.3	77.4	8.9
8	.815	.961	.635	.326	80.8	84.8	76.2	8.6
9	.830	.961	.645	.316	80.2	84.4	75.0	9.4
10	.836	.963	.651	.312	79.7	83.8	74.2	9.6
11	.826	.956	.646	.310	79.5	83.2	75.7	7.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	76.2	2.7	74.3	4.6	0.835	9.03	1.44	0.86
1	75.9	2.6	74.1	4.4	.830	.00	.35	.87
2	75.8	2.4	74.1	4.1	.830	.00	.25	.88
3	75.5	2.5	73.7	4.3	.816	8.89	.30	.87
4	74.6	2.6	72.8	4.4	.795	.64	.31	.87
5	75.6	2.3	74.0	3.9	.827	.97	.19	.88
6	74.9	2.3	73.3	3.9	.809	.77	.18	.87
7	75.4	2.6	73.6	4.4	.817	.86	.33	.87
8	76.2	4.1	73.3	7.0	.809	.72	2.19	.80
9	76.5	5.3	72.8	9.0	.795	.55	.85	.75
10	76.7	6.4	72.2	10.9	.781	.36	3.50	.71
11	77.0	7.3	71.9	12.4	.773	.28	4.00	.67
Noon.	77.3	8.0	71.7	13.6	.768	.19	.45	.65
1	77.3	8.2	71.6	13.9	.766	.16	.56	.64
2	77.4	8.0	71.8	13.6	.771	.21	.47	.65
3	77.6	8 2	71.9	13.9	.773	.24	.59	.64
4	77.5	7.9	72.0	13.4	.776	.28	.40	.65
5	77.2	6.7	72.5	11.4	.787	.44	3.69	.70
6	77.5	5.1	73.9	8.7	.824	.85	2.83	.76
7	77.2	4.3	74.2	7.3	.832	.96	.35	.79
8	76.9	3.9	74.2	6.6	.832	.96	.11	.81
9	76.8	3.4	74.4	5.8	.838	9.04	1.84	.83
10	76.4	3.3	74.1	5.6	.830	8.96	.76	.84
11	76.6	2.9	74.6	4.9	.843	9.11	.55	.86

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-point.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	°	Inches.		lbs	
1	130.0	0.15	S. E. & E. & S.	3	Cloudy till 10 A. M. Scatd. ⌒i & ⌣i till 6 P. M. cloudless afterwards; also drizzling incessantly from 1 to 10 A. M.
2	128.5	0.18	S. E. & E.	2½	Cloudless till 6 A. M. Scatd. ⌣i till 11 A. M. cloudy till 6 P. M. Scatd. ⌣i afterwards; also drizzling from Noon to 3 P. M.
3	132.0	0.58	N. & N. E. & S. E.	3	Scatd. ⌣i till 7 A. M. Scatd. ⌒i till Noon. cloudy till 8 P. M. cloudless afterwards; also drizzling at 1, 3 & 5 P. M. & thundering at 1 & 2 P. M.
4	...	...	*Sunday.*	3	
5	...	0.52	E. & S. E.	2	Cloudy till 7 P. M. cloudless afterwards; also drizzling from 5 to 11 A. M. & at 5 P. M.
6	127.0	0.87	S. E. & E.	3	Cloudy; also raining at 8 & 9 A. M. & from 1 to 4 P. M.
7	...	0.10	S. & E. & S. E.	3½	Cloudy till 6 A. M. Scatd. ⌒i & ⌣i till 6 P. M. cloudless afterwards; also raining at 2 & 3 A. M.
8	139.8	...	S.	2½	Cloudless till 4 A. M. Scatd. ⌣i & ⌒i till 6 P. M. cloudless afterwards.
9	143.0	...	S. & S. W.	2½	Cloudless till 8 A. M. Scatd. ⌒i till 6 P. M. cloudless afterwards.
10	144.0	...	S. W. & S.	2½	Cloudless till 7 A. M. Scatd. ⌒i till 4 P. M. cloudless afterwards.
11	...	...	*Sunday.*	2½	
12	144.0	...	S. W. & variable.	2½	Cloudless till 5 A. M. Scatd. \i & ⌣i till 9 A. M. Scatd. ⌒i till 5 P. M. cloudless afterwards.
13	139.7	...	N. E. & W.	2½	Cloudless till 8 A. M. Scatd. ⌣i & ⌒i till 4 P. M. cloudless afterwards.
14	137.2	...	N. E. & S.	2	Cloudless till 4 A. M. Scatd. ⌣i till 10 A. M. cloudy till 2 P. M. Scatd. ⌣i & ⌒i till 6 P. M. cloudless afterwards.
15	143.0	...	W. & S.	2½	Scatd. ⌣i & ⌒i till 3 P. M. cloudless afterwards.
16	144.0	...	S. & N. E.	2½	Cloudless.
17	...	...	S.	2	Cloudy till 6 P. M. cloudless afterwards; also drizzling from 8 to 11 A. M.
18	...	...	*Sunday.*	2½	
19	140.5	...	N. E. & S. E.	2½	Cloudless till 10 A. M. Scatd. ⌣i & ⌒i till 5 P. M. cloudless afterwards.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches			
20	124.0	...	N. & N. W.	1¾	Cloudless till 10 A. M. Scatd. clouds till 3 P. M. cloudless afterwards.
21	139.0	...	N. & N. E.	1½	Scatd. \i & —i till 9 A. M. Scatd. —i & ⌒i till 8 P. M. cloudless afterwards.
22	143.0	...	N. & N. W.	1½	Cloudless.
23	142.0	...	N. W. & N. & N. E.	1¾	Cloudless till 6 P. M. Scatd. \i & —i afterwards.
24	144.0	...	N. & N. E.	1¾	Cloudless till 1 P. M. Scatd. clouds till 5 P. M. cloudless afterwards.
25	...	...	*Sunday.*	2½	
26	139.7	...	N. & N. E. & calm.	1¾	Cloudless till 8 A. M. Scatd. ⌒i till 5 P. M. cloudless afterwards.
27	136.0	...	N. & E. & N. E.	1½	Scatd. clouds till 3 P. M. cloudy afterwards; also slightly drizzling at 7 P. M.
28	129.0	1.08	W. & S.	1½	Scatd. clouds till 11 A. M. cloudy till 5 P. M. Scatd. —i afterwards; also raining at 2 & 3 P. M.
29	135.4	...	N.	2¼	Scatd. —i till 3 A. M. Scatd. clouds till 1 P. M. Scatd. \i till 8 P. M. cloudless afterwards.
30	135.2	...	N. & N. W.	2½	Cloudless till 8 A. M Scatd. clouds till 7 P. M. cloudless afterwards.
31	139.1	...	N. W. & N.	1¼	Scatd. —i till 2 P. M. cloudless afterwards.

\i Cirri, —i Cirro strati, ⌒i Cumuli, ⌒i Cumulo strati, ⌐i Nimbi, —i Strati, ⌐i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.814
Max. height of the Barometer occurred at 9 A. M. on the 21st, ..	30.029
Min. height of the Barometer occurred at 4 P. M. on the 5th, ..	29.549
Extreme range of the Barometer during the month, ...	0.480
Mean of the daily Max. Pressures, ...	29.880
Ditto ditto Min. ditto, ...	29.756
Mean daily range of the Barometer during the month, ...	0.124

	o
Mean Dry Bulb Thermometer for the month, ...	81.3
Max. Temperature occurred at 2 P. M. on the 13th, ...	90.4
Min. Temperature occurred at 5 A. M. on the 23rd, ...	72.2
Extreme range of the Temperature during the month, ...	18.2
Mean of the daily Max. Temperature, ...	86.8
Ditto ditto Min. ditto, ...	77.0
Mean daily range of the Temperature during the month, ..	9.8

	o
Mean Wet Bulb Thermometer for the month, ...	76.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	4.8
Computed Mean Dew-point for the month, ...	73.1
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	8.2
	Inches
Mean Elastic force of Vapour for the month, ...	0.803

	Troy grains
Mean Weight of Vapour for the month, ...	8.65
Additional Weight of Vapour required for complete saturation, ..	2.59
Mean degree of humidity for the month, complete saturation being unity,	0.77

	Inches
Rained 9 days, Max. fall of rain during 24 hours, ...	1.08
Total amount of rain during the month, ...	3.48
Prevailing direction of the Wind, ...	N. & S.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1863.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	5		2		6		2		5		1				2		2		2
1	5		2		6	1	3		5		1				2		2		1
2	5		3		6	2	3		5		1		1		1		2		
3	5		3		4	2	2		4		1		2		1		2		3
4	6		2		3	1	3		3		1		2		2				5
5	6		2	1	2	1	3		6		1		2		1				4
6	8		2	1	2	1	4		6		1		2		2				
7	8		4		5	1	4		4		1		1						
8	6		5		4	2	5	1	4		1		1		1				
9	6		8		3	1	2		5	1	1				2	1			
10	6		6		4	1	4		5	1	2								
11	8		4		3	1	5		2		3	1	1		1				
Noon.	4		8				8				4	1	1		2				
1	5		8				6	1	3	1			3		2	1			
2	7		6		1		3		1		2		4	1	3				
3	6	1	5		1		4	1	2		2	1	3	1	4				
4	6		4		2		2		3		3	1	3		3				1
5	9	1	3		1	1	1		4		2		3		3				1
6	9		2		2		2		4		2		2		3		1		
7	8	1	2		2		2		5		1		2		4		1		
8	6		3		1		2		6		1		2		5		1		
9	6		2		3		1		6		1		2		5				1
10	4		2		4		1		6		1		2		5		1		1
11	5		2		4		1		6		1		2		4		1		1

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, Feet. 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	*Sunday.*							
2	29.845	29.921	29.784	0.137	77.2	84.8	70.2	14.6
3	.866	.934	.804	.130	78.6	86.3	71.2	15.1
4	.851	.925	.786	.139	77.9	85.5	71.0	14.5
5	.822	.893	.770	.123	76.7	84.7	70.6	14.1
6	.824	.892	.778	.114	76.6	84.9	68.4	16.5
7	.847	.910	.802	.108	75.9	82.6	69.4	13.2
8	*Sunday.*							
9	.862	.923	.816	.107	76.6	85.1	68 8	16.3
10	.909	.969	.861	.108	77.9	85.0	69.8	15.2
11	.964	30.018	.912	.106	76.7	85.7	74.4	11.3
12	.978	.055	.920	.135	76.2	81.4	72.2	9.2
13	.968	.015	.921	.094	76.4	81.4	73.8	7.6
14	.966	.037	.916	.121	78.0	84.9	73.9	11.0
15	*Sunday.*							
16	.929	29.995	.870	.125	79.6	85.8	75.0	10.8
17	.930	30.008	.880	.128	77.8	83.8	73.4	10.4
18	.973	.046	.899	.147	74.3	81.8	67.8	14.0
19	30.019	.083	.961	.122	72.7	80.6	65.0	15.6
20	.024	.101	.970	.131	70.9	79.4	64.7	14.7
21	.000	.078	.935	.143	72.6	80.8	65.8	15.0
22	*Sunday.*							
23	.047	.122	.996	.126	73.3	81.6	66.7	14 9
24	.035	.113	.983	.130	73.1	81.6	66.0	15.6
25	.019	.095	.951	.144	72.7	81.5	65.4	16.1
26	29.989	.074	.920	.154	73.3	81.2	66.4	14.8
27	.974	.036	.930	.106	73.4	81.4	67.0	14.4
28	30.041	.109	.970	.139	71.2	80.0	64.8	15.2
29	*Sunday.*							
30	.040	.110	.985	.125	68.5	77.4	61.6	15.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	*Sunday.*							
2	70.6	6.6	66.0	11.2	0.638	6.92	3.03	0 70
3	71.2	7.4	66.0	12.6	.638	.90	.48	.67
4	70.8	7.1	65.8	12.1	.634	.87	.29	.68
5	69.5	7.2	64.5	12.2	.607	.60	.20	.67
6	68.5	8.1	62.8	13.8	.574	.23	.54	.64
7	68.9	7.0	64.0	11.9	.597	.49	.08	.68
8	*Sunday.*							
9	69.5	7.1	64.5	12.1	.607	.60	.17	.68
10	70.4	7.5	65.1	12.8	.619	.71	.45	.66
11	72.4	4.3	69.4	7.3	.713	7.75	2.05	.79
12	72.8	3.4	70.4	5.8	.736	8.00	1.66	.83
13	73.2	3.2	71.0	5.4	.751	.17	.55	.84
14	73.5	4.5	70.3	7.7	.734	7.95	2.24	.78
15	*Sunday.*							
16	74.9	4.7	71.6	8.0	.766	8.27	.42	.77
17	71.4	6.4	66.9	10.9	.657	7.12	3.01	.70
18	66.9	7.4	61.7	12 6	.554	6.03	.09	.66
19	64.7	8.0	58.3	14.4	.494	5.40	.28	.62
20	64 2	6.7	58.8	12.1	.503	.51	2.72	.67
21	66.0	6.6	60.7	11.9	.536	.86	.80	.68
22	*Sunday.*							
23	67.2	6.1	62.3	11.0	.565	6.17	.67	.70
24	66.4	6.7	61.0	12.1	.541	5.91	.88	.67
25	66.9	5.8	62.3	10.4	.565	6 18	.50	.71
26	67.4	5.9	62.7	10.6	.572	.25	.59	.71
27	68.1	5.3	63.9	9.5	.595	.50	.37	.73
28	63.7	7.5	57.7	13.5	.485	5.31	.99	.64
29	*Sunday.*							
30	61.9	6.6	56.6	11.9	.467	.15	.50	.67

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.946	30.045	29.807	0 238	72.2	77.7	62.9	14.8
1	.937	.037	.800	.237	71.6	76.9	62.8	14.1
2	.931	.029	.791	.238	71.0	76.0	62.8	13.2
3	.913	.023	.790	.233	71.2	75.6	65.7	9.9
4	.921	.021	.794	.227	69.5	75.4	62.9	12.5
5	.940	.032	.815	.217	69.7	75.4	62.0	13.4
6	.957	.046	.827	.219	69.1	75.4	61.6	13.8
7	.977	.077	.839	.238	69.4	75.2	62.2	13.0
8	.997	.110	.860	.250	72.6	77.8	64.5	13.3
9	30.013	.116	.888	.228	75.0	80.0	66.6	13.4
10	.015	.122	.892	.230	77.1	81.8	70.2	11.6
11	29.995	.104	.855	.249	79.1	83.3	72.6	10.7
Noon.	.969	.070	.837	.233	80.8	85.7	75.2	10.5
1	.933	.042	.809	.233	81.9	85.2	76.4	8.8
2	.912	.021	.780	.241	82.2	85.8	76.6	9.2
3	.900	.014	.771	.243	82.1	86.3	75.9	10.4
4	.894	29.996	.770	.226	80.8	85.3	75.2	10.1
5	.908	30.020	.775	.245	78.6	84.0	73.8	10.2
6	.917	.028	.779	.249	76.9	81.8	71.6	10.2
7	.935	.050	.785	.265	75.8	81.2	70.2	11.0
8	.950	.068	.794	.274	74.7	80.6	68.0	12.6
9	.960	.079	.806	.273	73.9	79.8	66.8	13.0
10	.965	.087	.820	.267	73.3	78.8	66.0	12.8
11	.958	.082	.828	.254	72.7	78.2	65.5	12.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	68.1	4.1	64.8	7.4	0.613	6.73	1.82	0.79
1	67.8	3.8	64.8	6.8	.613	.73	.67	.80
2	67.4	3.6	64.5	6.5	.607	.67	.58	.81
3	67.6	3.6	64.7	6.5	.611	.70	.60	.81
4	66.0	3.5	63.2	6.3	.582	.41	.47	.81
5	66.3	3.4	63.6	6.1	.590	.49	.44	.82
6	65.9	3.2	63.3	5.8	.584	.43	.35	.83
7	66.1	3.3	63.5	5.9	.588	.47	.39	.82
8	67.7	4.9	63.8	8.8	.593	.49	2.17	.75
9	68.3	6.7	63.6	11.4	.590	.43	.88	.69
10	69.0	8.1	63.3	13.8	.584	.33	3.59	.64
11	69.7	9.4	63.1	16.0	.580	.26	4.27	.59
Noon.	70.3	10.5	62.9	17.9	.576	.20	.87	.56
1	70.7	11.2	62.9	19.0	.576	.19	5.25	.54
2	70.8	11.4	62.8	19.4	.574	.17	.37	.54
3	70.7	11.4	62.7	19.4	.572	.15	.36	.53
4	70.8	10.0	63.8	17.0	.593	.39	4.68	.58
5	70.8	7.8	65 3	13.3	.623	.75	3.63	.65
6	71.0	5.9	66.9	10.0	.657	7.13	2.73	.72
7	70.3	5.5	66.4	9.4	.646	.04	.50	.74
8	69.9	4.8	66.5	8 2	.648	.07	.16	.77
9	69.3	4.6	66.1	7.8	.640	6.99	.02	.78
10	68.8	4.5	65.2	8.1	.621	.80	.04	.77
11	68.5	4.2	65.1	7.6	.619	.78	1.90	.78

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches		lbs	
1	...	...	*Sunday.*	2½	
2	139.5	...	N. & W.	2¼	Cloudless.
3	142.2	...	N.	1½	Cloudless.
4	141.2	...	N.	2	Cloudless.
5	140.9	...	N.	2	Cloudless.
6	145.0	...	N.	1¼	Cloudless.
7	126.4	...	N.	1	Cloudless till 9 A. M.; Scatd. clouds afterwards.
8	...	...	*Sunday.*	1¼	
9	145.6	...	N.	1¼	Cloudless.
10	143.0	...	N.	1¾	Cloudless till 9 A. M. cloudy afterwards.
11	140.2	1.04	N. & S. E.	2¼	Cloudless till 5 A. M. cloudy afterwards; also raining at 2 & 3 P. M. & drizzling at 6 & 7 P. M.
12	...	...	S. E. & N. & N. E.	1¼	Cloudy; also very slightly drizzling at 9 A. M.
13	...	0.22	N. E. & E.	1	Cloudy; also drizzling occasionally.
14	136.0	...	E.	2½	Cloudy till Noon; Scatd. ⌣i till 7 P. M. cloudless afterwards.
15	...	...	*Sunday.*	1¾	
16	141.8	...	S. W. & N.	1¼	Scatd. ⌣i till 11 A. M.; Scatd. ∩i till 4 P. M. cloudless afterwards.
17	146.0	...	N. W. & W.	1¼	Cloudless.
18	141.6	...	N. & N. W. &. W.	1	Cloudless; also slightly foggy from 8 to 10 P. M.
19	137.7	...	Variable.	1¼	Cloudless.
20	134.4	...	W. & N. W. & N.	1	Cloudless.
21	142.0	...	W.	1	Cloudless till 2 P. M. Scatd. ⌣i till 7 P. M. cloudless afterwards.
22	...	...	*Sunday.*	1	
23	139.0	...	N. W. & N.	1	Cloudless till 11 A. M. Scatd. ∩i till 3 P. M. cloudless afterwards.
24	141.5	...	N. & N. W.	1	Cloudless.
25	140.2	...	N. & N. E.	¾	Cloudless.
26	138.5	...	N. & N. W.	1	Cloudless.
27	139.8	...	N. & S.	1	Cloudless.
28	141.2	...	N. & N. E..	1	Scatd. ⌣i till 10 A. M. cloudless afterwards.
29	...	...	*Sunday.*	1¼	
30	137.2	...	N. E. & N. W. & N.	1	Cloudless.

⌒i Cirri, ⌣i Cirro strati, ∩i Cumuli, ⌒i Cumulo strati, ⌣i Nimbi,—i Strati, ⌒i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.948
Max. height of the Barometer occurred at 10 A. M. on the 23rd, ..	30.122
Min. height of the Barometer occurred at 4 P. M. on the 5th, ..	29.770
Extreme range of the Barometer during the month, ...	0.352
Mean of the Daily Max. Pressures, ...	30.018
Ditto ditto Min. ditto, ...	29.893
Mean daily range of the Barometer during the month, ...	0.125

	°
Mean Dry Bulb Thermometer for the month, ...	75.2
Max. Temperature occurred at 3 P. M. on the 3rd, ...	86.3
Min. Temperature occurred at 6 A. M. on the 30th, ...	61.6
Extreme range of the Temperature during the month, ...	24.7
Mean of the daily Max. Temperature, ...	82.8
Ditto ditto Min. ditto, ...	68.9
Mean daily range of the Temperature during the month, ...	13.9
Mean Wet Bulb Thermometer for the month, ...	68.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	6.3
Computed Mean Dew-point for the month, ...	64.5
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	10.7

	Inches
Mean Elastic force of Vapour for the month, ...	0.607

	Troy grains
Mean Weight of Vapour for the month, ...	6.61
Additional Weight of Vapour required for complete saturation, ..	2.76
Mean degree of humidity for the month, complete saturation being unity,	0.71

	Inches
Rained 3 days, Max. fall of rain during 24 hours, ...	1.04
Total amount of rain during the month, ...	1.26
Prevailing direction of the Wind, ...	N.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1863.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	16		2		1								2		4				
1	15		2		1								2		5				
2	14		2	1	1								2		5				1
3	15		2	1	1								2		2				3
4	13		2		1								1		3				5
5	11		3		1		1				1		2		2				4
6	13		3		1		1				1		2		4				
7	13		4		1						1		1		5				
8	14		3		4						1		1		1				1
9	13		4	1	3	1					1		1		2				1
10	12		5		2		2						1		3				
11	12		4		2		2						2		3				
Noon.	10		7		2		1		2				1		2				
1	11		5		2		1		2		1		3						
2	11		4		2	1	1	1	2		1		3		1				
3	13		1		2		2	1	1		1		2		3				
4	9		3		1		3				2		3		3				1
5	12		2		2	1	1		1		3		2		2				
6	11	1	2		3				1		1		4		3				
7	11	1	1		3				1		1		3		5				
8	11		1		3				1		1		3		5				
9	11		1		3				1				3		5		1		
10	11		1		2		1		1				4		4		1		
11	11		1		2		1				1		3		4		1		1

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.024	30.092	29.966	0.126	67.5	75.3	61.4	13.9
2	.063	.136	30.011	.125	66.9	77.2	59.0	18.2
3	.050	.140	29.980	.160	66.0	76.0	59.0	17.0
4	.016	.092	.950	.142	66.2	76.7	57.6	19.1
5	.028	.118	.971	.147	67.1	76.9	59.0	17.9
6	*Sunday.*							
7	29.970	.045	.914	.131	67.3	76.6	59.6	17.0
8	.996	.052	.952	.100	67.9	77.4	59.2	18.2
9	30.035	.110	.968	.142	67.8	77.2	59.6	17.6
10	.024	.100	.955	.145	68.0	77.8	59 6	18.2
11	29.994	.051	.943	.108	69.6	79.7	61.8	17.9
12	30.035	.118	.976	.142	68.3	78.4	61.0	17.4
13	*Sunday.*							
14	.046	.117	.997	.120	65.4	75.4	57.2	18.2
15	.043	.115	.988	.127	65.2	75.8	57.4	18.4
16	.024	.092	.963	.129	64.7	75.5	56.4	19.1
17	.002	.065	.934	.131	65.5	75.6	56.6	19.0
18	.052	.124	.973	.151	66 5	76.2	57.8	18.4
19	.076	.153	30.015	.138	66.5	76.2	57.4	18.8
20	*Sunday.*							
21	.065	.140	29.998	.142	66.1	76.6	57.4	19.2
22	.021	.099	.953	.146	67.6	78.8	58.4	20.4
23	.034	.108	.976	.132	69.3	78.0	62 6	15.4
24	.062	.139	30.006	.133	66.8	75.2	59.4	15.8
25	.054	.141	29.987	.154	65.1	75.2	57.6	17.6
26	.044	.119	.996	.123	65.0	76.4	56.8	19.6
27	*Sunday.*							
28	.060	.136	30.016	.120	65.6	75.4	56.8	18.6
29	.028	.095	29 975	.120	66.6	76.5	59.4	17 1
30	.014	.082	.948	.134	67.1	77.0	61.0	16.0
31	29.997	.077	.928	.149	65.8	75.8	57.2	18.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	61.0	6.5	55.8	11.7	0.455	5.03	2.39	0 68
2	60.4	6.5	55.2	11·7	.445	4.93	.35	.68
3	59.5	6.5	54.3	11.7	.432	.79	.29	.68
4	59.6	6.6	54 3	11.9	.432	.79	.33	.67
5	61.1	6.0	56.3	10.8	.462	5.11	.21	.70
6	*Sunday.*							
7	61.3	6.0	56.5	10.8	.465	.14	.23	.70
8	62.0	5.9	57.3	10.6	.478	.27	.24	.70
9	62.2	5.6	57.7	10.1	.485	.35	.13	.72
10	62.1	5.9	57.4	10.6	.480	.29	.24	.70
11	63.2	6.4	58.1	11.5	.491	.40	.50	.68
12	61.6	6.7	56.2	12.1	.461	.08	.52	.67
13	*Sunday.*							
14	59.0	6.4	53.9	11.5	.426	4.73	.22	.68
15	59.3	5.9	54.6	10.6	.437	.85	.06	.70
16	59.0	5.7	54.4	10.3	.434	.82	1.98	.71
17	60.1	5.4	55.8	9.7	.455	5.05	.93	.72
18	60.9	5.6	56.4	10.1	.464	.14	2 05	.72
19	60.0	6.5	54.8	11.7	.440	4.86	.33	.68
20	*Sunday.*							
21	60.2	5.9	55.5	10.6	.450	.99	.11	.70
22	62.0	5.6	57.5	10.1	.481	5.32	.12	.72
23	63 5	5.8	58.9	10.4	.504	.56	.27	.71
24	60.5	6.3	55.5	11.3	.450	4 99	.27	.69
25	59.3	5.8	54.7	10.4	.438	.87	.02	.71
26	59.2	5.8	54.6	10.4	.437	.86	.01	.71
27	*Sunday.*							
28	59.5	6.1	54.6	11.0	.437	.85	.15	.69
29	61.1	5.5	56.7	9.9	.469	5.18	.03	.72
30	62.0	5.1	57.9	9.2	.488	.39	1.93	.74
31	59.3	6.5	54.1	11.7	.429	4.76	2.28	.68

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From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	30.035	30.097	29.948	0.149	62.4	65.8	59.4	6.4
1	.027	.096	.939	.157	61.8	65.2	58 8	6.4
2	.019	.081	.936	.145	61.1	64.8	58.4	6.4
3	.014	.073	.954	.119	60.4	64.0	57.8	6.2
4	.005	.067	.934	.133	59.9	63.4	57.6	5.8
5	.015	.055	.945	.110	59.5	62.7	56.8	5.9
6	.035	.092	.965	.127	59.0	62.7	56.4	6.3
7	.054	.100	.991	.109	58.9	62.8	56.4	6.4
8	.080	.125	30.014	.111	62.8	65.8	59.0	6.8
9	.099	.140	.015	.095	65.6	69.8	62.4	7.4
10	.105	.153	.045	.108	68.5	72.4	66.0	6.4
11	.088	.129	.030	.099	71.6	75.0	68.8	6.2
Noon.	.060	.108	29.999	.109	73.9	77.3	71.4	5.9
1	.022	.064	.968	.096	75.5	78.5	73.0	5.5
2	29.998	.040	.939	.101	76.5	79.7	74.0	5.7
3	.981	.030	.929	.101	76.3	78.6	74 8	3.8
4	.975	.030	.914	.116	74.8	77.2	73.2	4.0
5	.983	.044	.923	.121	72.3	75.0	69.6	5 4
6	.993	.058	.937	.121	69.8	72.2	68.2	4.0
7	30.011	.076	.960	.116	67.7	71.0	66.0	5.0
8	.027	.089	.975	.114	66.4	69.4	64.6	4.8
9	.039	.104	.979	.125	65.2	68 6	63.4	5.2
10	.046	.113	.986	.127	64.1	67.9	62.3	5.6
11	.040	.104	.983	.121	63.4	67.2	61.3	5.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	59.2	3.2	56.3	6.1	0.462	5.17	1.16	0.82
1	58.8	3.0	56.1	5.7	.459	.14	.07	.83
2	58.2	2.9	55.6	5.5	.452	.06	.02	.83
3	57.5	2.9	54.9	5.5	.441	4.94	.01	.83
4	57.1	2.8	54.6	5.3	.437	.91	0.94	.84
5	56.7	2.8	54.2	5.3	.431	.84	.94	.84
6	56.3	2.7	53 9	5.1	.426	.80	.89	.84
7	56.1	2.8	53.6	5.3	.422	.75	.92	.84
8	58.3	4.5	54.2	8.6	.431	.80	1.61	.75
9	59.8	5.8	55.2	10.4	.445	.95	2.05	.71
10	61.6	6.9	56.1	12.4	.459	5.08	.57	.66
11	63.0	8.6	56.1	15.5	.459	.03	3.37	.60
Noon.	63.5	10.4	56.2	17.7	.461	.02	.99	.56
1	63.9	11.6	55.8	19.7	.455	4.94	4.52	.52
2	64.2	12.3	55.6	20.9	.452	.90	.85	.50
3	64.0	12.3	55.4	20.9	.449	.87	.82	.50
4	63.5	11.3	55.6	19.2	.452	.93	.33	.53
5	63.8	8.5	57.0	15.3	.473	5.18	3.40	.60
6	63.4	6.4	58.3	11.5	.494	.43	2.52	.68
7	62.7	5.0	58.7	9.0	.501	.54	1.92	.74
8	61.9	4.5	58 3	8.1	.494	.47	.70	.76
9	61.1	4.1	57.8	7.4	.486	.40	.51	.78
10	60.5	3 6	57.3	6.8	.478	.31	.36	.80
11	60.0	3.4	56.9	6.5	.472	.25	.28	.80

All the Hygrometrical elements are computed by the Greenwich Constants.
From the 1st January, 1863, the Greenwich New Factors have been used for computing Dew-points.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches		lbs	
1	122.0	...	N.	1	Scatd. clouds till 9 A.M., Scatd. ⌇i & ⌇i till 6 P. M. cloudless afterwards.
2	136.0	...	N.	1½	Cloudless till 6 A. M. Scatd. ⌇i till 3 P. M. Scatd. ⌇i till 6 P. M. cloudless afterwards.
3	139.0	...	N. & N. W.	¾	Cloudless till 8 A. M. Scatd. ⌇i till Noon; cloudless afterwards also foggy at 9 P. M.
4	136.2	...	N. & N. W.	¾	Cloudless.
5	135.0	...	N.	½	Cloudless.
6	...	...	*Sunday.*	1	
7	139.0	...	W. & N. W.	1	Cloudless.
8	137.5	...	N. W. & E.	½	Cloudless.
9	136.5	...	N. & N. W.	½	Cloudless.
10	138.0	...	N. W.	½	Cloudless.
11	137.0	...	S. W. & N.	¼	Cloudless till 6 A. M. Scatd. ⌇i & ⌇i till 6 P. M. cloudless afterwards.
12	138.6	...	N. W. & W.	1½	Cloudless till 8 A. M. Scatd. ⌇i & ⌇i till 6 P. M. cloudless afterwards.
13	...	...	*Sunday.*	1	
14	135.0	...	N.	¼	Cloudless.
15	135.0	...	N. & N. W.	¼	Cloudless.
16	135.5	...	N. & N. W.	¼	Cloudless.
17	135.0	...	N. & N. W.	½	Cloudless; also slightly foggy from 9 to 11 P. M.
18	137.2	...	N.	¼	Cloudless.
19	135.8	...	N.	1¼	Cloudless; also slightly foggy at 9 & 10 P. M.
20	...	...	*Sunday.*	¼	
21	138.0	...	N.	¼	Cloudless; also foggy from 8 to 11 P. M.
22	139.7	...	S. & W.	¾	Cloudless.
23	134.0	...	N. & W. & S.	¼	Cloudless.
24	135.0	...	N.	¼	Cloudless.
25	136.0	...	N.	¼	Cloudless.
26	139.0	...	N. & N. W.	¼	Cloudless.
27	...	...	*Sunday.*	¼	

⌇i Cirri, ⌇i Cirro strati, ⌒i Cumuli, ⌒i Cumulo strati, ⌇i Nimbi,—i Strati ⌇i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	o	Inches.		lb	
28	128.0	...	N. & W.	¼	Scatd. \—i till 3 P. M. cloudy till 8 P. M. cloudless afterwards also foggy between 9 & 11 P. M.
29	124.8	...	W. & N. & S. W.	¼	Scatd. \i & \—i till 4 P. M. cloudless afterwards.
30	134.0	...	N.	¼	Cloudless.
31	137.0	...	N. & W. & N. E.	¼	Cloudless; also slightly foggy at 11 P. M.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	30.032
Max. height of the Barometer occurred at 10 A. M. on the 19th, ..	30.153
Min. height of the Barometer occurred at 4 P. M. on the 7th, ..	29.914
Extreme range of the Barometer during the month, ...	0.239
Mean of the Daily Max. Pressures, ...	30.106
Ditto ditto Min. ditto, ...	29.972
Mean daily range of the Barometer during the month, ...	0.134

	°
Mean Dry Bulb Thermometer for the month, ...	66.7
Max. Temperature occurred at 2 P. M. on the 11th, ...	79.7
Min. Temperature occurred at 6 & 7 A. M. on the 16th, ...	56.4
Extreme range of the Temperature during the month, ...	23.3
Mean of the daily Max. Temperature, ...	76.6
Ditto ditto Min. ditto, ...	58.7
Mean daily range of the Temperature during the month, ...	17.9

	Inches
Mean Wet Bulb Thermometer for the month, ...	60.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	6.0
Computed Mean Dew-point for the month, ...	55.9
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	10.8
Mean Elastic force of Vapour for the month, ...	0.456

	Troy grains
Mean Weight of Vapour for the month, ...	5.05
Additional Weight of Vapour required for complete saturation, ..	2.18
Mean degree of humidity for the month, complete saturation being unity,	0.70

	Inches
Rained No days, Max. fall of rain during 24 hours, ...	*Nil.*
Total amount of rain during the month, ...	*Nil.*
Prevailing direction of the Wind, ...	N.&NW

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1863.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	17		1								1		2		4				2
1	18		1						1		1		2		4				
2	18		1						1		1		2		4				
3	18		1						1		1		1		4				1
4	17								1		1		3		3				2
5	13		1						1		1		3		1				7
6	19								1		2		2		2				1
7	17		1		1				1		3		3		1				
8	20		3		1						2				1				
9	16		4		2						2		2		1				
10	14		4		3						2		3		1				
11	14		3		3		1				1		1		4				
Noon.	16		2				1		1		4		1		2				
1	14		2						1				4		6				
2	18		1						1		1		1		5				
3	15		1						1		1		1		8				
4	14		1								1		2		9				
5	13										1		4		9				
6	13												5		8				1
7	13										1		5		8				
8	13								1				5		8				
9	14								1				5		7				
10	13								1				5		7				1
11	13								1				4		7				2

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JOURNAL

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An Account of Upper Ḳásh-ḳár, and Chitrál, or Lower Ḳásh-ḳár, together with the independent Afyhán State of Panj-korah, including Túl-ásh.[*]

Most modern travellers have either not mentioned the two first-named countries at all in their works, or have, from ignorance of oriental languages, or carelessness in writing names, so confounded them with a province of Chinese Túrkistán, that their very existence has been called into question, and even totally denied, by many authors.

Mr. Elphinstone, in his excellent work—"The Kingdom of Caubul," remarks on this very subject in the following manner:—"The resemblance of the names led us into great mistakes when we first arrived at Pesháwar. We bought tea, which we were told was brought from Kaushkaur (Cashgar), and the first people whom we asked respecting the distance told us we might easily go to Kaushkaur, and return within a fortnight. In time, however, we obtained more precise information." These doubts and mistakes have been solely occasioned by not taking proper account of the mode of writing, and the pronunciation of the names of the two countries; that of Chinese Tartary being written كاشغر *(ḳásh-ghar)*, whilst that of which I intend giving some account, is written قاشقار *(ḳásh-ḳár)*, a very different sound to that of the former.

The native land of all the chimeras of Bákhtro Indian origin, contained in the mythological system of the ancient Persians, as indicated

[*] Being the continuation to "*Notes on Káfiristán*," in No. 4 of the Journal for 1859.

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from the ruins of Persepolis, is the range of mountainous country which separates Bákhtriánah from Hindústán and China, bounded on the east and north by the desert of Kobí; and, as we gather from the first chapter of the Zand-áwestah, is included in the country therein called Eeriene—the supposed abode of the old Medo-Persian race. It was celebrated for its gold and gems, and other precious productions, which it continues to yield, in some degree, up to the present time. It is also the legendary abode of the traditionary monsters, celebrated in Oriental poetry and fable, now become familiar to the natives of the west.

In this mountainous range lies Ḳash-ḳár, or Chitrál, as the lower portion of the valley is also named; it is what has been sometimes called the country of Sháh Kaṭor. It is included in the valley of the upper sources of the river best known as the Kámah, and the Kunar.*

Ḳásh-ḳár (concerning which, probably, less is known than of any other part of Central Asia, not including even Káfiristán), is bounded on the north by the high land of Pámír; south by the Lás-púr range of mountains, bounding the Afghán district of Panj-korah to the north; north-east by the mountainous region to the west of the Yár-kand river, known to the people of these regions as Bilauristán or the "Region of Crystal,"† from the quantity of that substance with which it abounds; south-east by Gilgiṭṭ and Little Thibet; and west by the hills of Wákhán, bordering the left bank of the river Oxus, and separating Chitral, or Lower Ḳásh-ḳár, from Badakhshán and the eastern frontier of Káfiristán, running parallel to the right or northern bank of the Chitrál or Ḳásh-ḳár river. It is a long valley into which a series of smaller valleys and defiles open out, which, in the northern part, act as water-courses to drain Pámír. It is oblong in form, and runs almost in a north-east and south-west direction. It resembles Káfiristán in physical appearance and coldness of climate;

* On looking over the paper on Káfiristán, I find the name of this river has been printed "Kunir" and "Kuner." This spelling, however, is not right: "Kunar" is the correct orthography. In the same paper also, "Bájawer" appears instead of "Bájáwṛṛ."

† "There are certain other mountains called *Bilor* (Bilaur) in the country of the tribe of Turks denominated Hamlán. In two days' journey you arrive at another part of Túrkistán where the Bhotyas and Dyán dwell. Their king is Bhot Shah, and their cities are Gilgitt, Asúrah (Astor ?), Salas (Chilás ?), etc., and their language is Túrkí." Sir H. M. Elliot's INDEX TO MUHAMMADAN HISTORIANS, page 31, vol. I. See also the extract from Khushḥál Khán's Pus'hto poem, in the "ACCOUNT OF SUWÁT;"—Journal for 1862, page 278.

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but it lies somewhat higher, and although rough and difficult in many places, it contains a greater portion of *plateaux*, and a greater number of level and open valleys. In some parts, also, it is well sheltered; and the soil, generally, is rich and fertile, producing much grain, and several descriptions of fruit.

It is divided into two states—Ḳásh-ḳár-i-Bá-lá, or Upper Ḳásh-ḳár, and Ḳásh-ḳár-i-Pá-ín,* or Lower Ḳásh-ḳár—both of which are ruled by separate chiefs, entirely independent of each other; but, at the same time, on the most friendly terms.

The former principality is less known than the latter; hence the two have often been confounded together, and called the country of Sháh Kaṭor. Both rulers are absolute over their subjects, and have the reputation of selling them into slavery without the slightest compunction. The people are designated among themselves by the general name of Chitrár.

Lower Ḳásh-ḳár.

Lower Ḳásh-ḳár, or Chitrál, is the real country of Sháh Kaṭor, and is the most westerly of the two states. It lies immediately under the southern slopes of the mountains of Hindú Kush, which separate it from Badakhshán; and through the centre of this state, as well as of Upper Ḳásh-kár, the river, here named after the country fertilized by its waters, flows to the south-west, and joins the Kámah at Cheghán-saráe.†

The chief town or capital of Lower Ḳásh-ḳár is Drúsh, the residence of Tajammul Sháh, the son and successor of Sháh Kaṭor, who appears

* For the information of "Comparative Philologists," I beg to say that the words *Bá-lá* and *Pá-ín* are Persian.

† "The original country of the *C'hasas* seems to have been the present country of Cashcar to the N. E. of Cabul; for the C'hasas, in the institutes of Menu, are mentioned with the Daradas, who are obviously the *Dardæ* of Ptolemy, whose country now called *Darad* by the natives, and *Dawurd* by the Persian authors, is to the N. W. of Cashmir; and extends towards the Indus: hence Ptolemy, with great propriety, asserts, that the mountains to the north-east of Cabul, are the real Caucasus. The country of Cashcar is situated in a beautiful valley, watered by a large river, which, after passing close to Chága Seray, Cooner, and Noorgul, joins the *Lunda Sindh*, or little *Sindh*, below Jelálábád, in the small district of *Cameh* (for there is no town of that name), and from this circumstance the little Sindh is often called the river Cameh. **** Cashcar is also Cashtwar, which denomination is generally distorted into Kétwer and Cuttor by Persian authors and travellers. The town and district of Ketwer, mentioned in the life of Amir Timur, is different from this; and lies about fifteen miles to the N. W. of Chágá Seray, on a pretty large river, which comes from Vahí Gálamb: it is generally pronounced Catowr." Wilford: *On Mount Caucasus*;—Asiatic Researches, Vol. VI. pp. 137-8.

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to have been a good ruler, and deservedly popular. He was, however, a soldier of fortune originally, and dethroned the rightful sovereign, a grandson of whom Vinge met with, living under the protection of the kind-hearted and hospitable Ahmad Sháh, the Gylfo or prince of Little Thibet. The town is situated in the centre of the valley on a rising ground, on the eastern, or left, or southern bank of the river previously referred to, and over which there is a large and well built wooden bridge, considered by the natives a somewhat wonderful object. The town is said to contain about two thousand houses, and between nine and ten thousand inhabitants. All the chief men of the country have dwellings of considerable size in the capital, where they are expected chiefly to reside. Persons engaged in trade to any extent, together with artizans and mechanics, also dwell almost exclusively at Drúsh.

The other considerable towns are,—Lás-púr (giving name to the mountains so called) to the east of Drúsh and north of Drál;* Puritt to the north of Drúsh and south of Ash-rít; Ash-rít north of Purítt and east of Drúsh; Bedlur† to the northward of Drúsh and south of Hích-gun.

The country lying to the south of the capital is thinly peopled; but towards the north-east and west, it is very populous. The inhabitants are Muhammadans professing the Shí-áh doctrine, the same as followed by the Persians of the present day.

All complaints of importance, and cases of litigation, are investigated and determined at Drúsh by the ruler himself; indeed, all complainants residing within four days' journey, are required to appear before the supreme authorities in all cases. Persons dwelling at a greater distance are permitted to appear before the subordinate chiefs, who are empowered to hear and decide matters of minor importance, subject to appeal to the Sháh.

Tajammul Sháh can collect, upon occasion, a force of 12,000 match-lock-men, who are not paid in money for their services, but in kind. The whole of the people are well provided with fire-arms with rests; indeed, there are few persons without arms. These match-locks are long and heavy, similar to those of Túrkistán (from whence, most likely, they are obtained) and carry a ball a long distance. The Ḳásh-

* A valley containing several small hamlets, belonging to Panj-korah. See page 23.

† Bilaur (crystal) ?

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káris are excellent marksmen; and powder and lead being exceedingly expensive, when they do discharge their pieces, it is generally with effect; and no shots are thrown away.

About 10,000 Sí'áh-posh Káfirs,* of the Kámúz tribe, who inhabit the upper, or northern part of the valley of the Ḳásh-ḳár or Chitrál river, lying nearest to the valley of the Kok-cháh river of Badakhshán, and north of the country held by the Kaṭṭár and Kampar tribes of Sí'áh-posh, are subject to the Sháh, to whom they pay a small tribute. Their religion is not interfered with; and they are, upon the whole, very obedient subjects, and are unlike the generality of mountain tribes, inasmuch as they do not rob. The Askín Káfirs, a great portion of whom have embraced Muhammadanism, as well as the Ashpins, are also subjects of the ruler of Lower Ḳásh-ḳár, as already mentioned in my account of that people.

Upper Ḳásh-ḳár.

This is the territory of Gauhar Amán Sháh, surnamed Chál, son and successor of Malik Amán, the former ruler. The people are Shiáh Muhammadans—that is to say, if a person should ask them what religion they profess, they will answer that they are Musalmáns and Shiáhs; but if he enquire of them what is meant by the word Shiáh, they will probably say they do not know. In the other state of Chitrál, or Lower Ḳásh-ḳár, the people, as far as prayers, fasts, and other exterior observances go, are Muhammadans; but there are few signs of it in Upper Ḳásh-ḳár.

The chief town is Más-túch, or Más-toj, lying about three stages or *manzils* of 25 coss, or 37 to 38 miles each, N. N. W. from Gilgiṭṭ; but it is a place of no great size, containing only four hundred houses, and about 2,000 inhabitants. It lies in the same valley as Lower Ḳásh-ḳár; and also stands on the right or western bank of the Chitrál or Ḳásh-ḳár river, but nearer its source. The town is protected by a small fortress; and the main routes followed by the caravans of merchants from Pes'háwar, Badakhshán, and Yárkand, meet here. Gauhar Amán, the ruler, resides a good deal at Yasín, which is a still smaller place than Más-túch, but it is more conveniently situated, being nearer towards Dar-band, the fortified pass leading into the country, towards the west. There are numerous ancient ruins in this neighbourhood. Drúsh, the capital of

* See "*Notes on Káfiristán*" in the Journal for 1859.

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Lower Ḳásh-ḳár or Chitrál, lies to the south-west of Más-túch. To the east of the latter place is Hích-gún, to the south of which again is Shotai.

The elevated *plateau* of Upper Ḳásh-ḳár is inclosed by towering hills surrounding it on all sides, except towards the south-west, in which direction the Ḳásh-ḳár or Chitrál river, so often referred to, flows. At the same time, however, it must be remembered, that the whole of Ḳásh-ḳár, both Upper and Lower, is crossed by several smaller ranges of hills, and by numerous narrow valleys, some of which are of considerable length.

Several passes lead into the two Ḳásh-ḳárs, the chief of which is the *Kotal* Lahorí, or Lahorí Pass leading into Panj-korah through the Láspúr mountains, dividing the latter from the former state. By this route Más-túch may be reached from Drúsh, which is distant three manzils or stages, occupying two nights and a day, in the summer months. The Sí'áh-posh Káfirs infest the Pass at times, and plunder travellers. The road is also somewhat difficult between Panj-korah and Drúsh; but beyond, it is very good; and the country is like a vast plain, gradually sloping upwards towards the high land of Pámír, to the north and east. The roads throughout Lower Ḳásh-ḳár or Chitrál, and Upper Ḳásh-ḳár, are generally good, and clear of much obstruction; consequently, there would be no difficulty for the passage of light artillery.

The nearest road from Chitrál or Lower Ḳásh-ḳár to Badakhshán lies across the range of Hindú Kush—called the Badakhshán Ridge by Macartney*—on the northern slope of which a small river rises, and after flowing about twenty-five miles, enters the Panj, or Upper branch of the Oxus, at Ishtárak in the latter country. The path lies along the banks of this stream, and is only practicable in the summer months, and then only for persons on foot, who can thus reach Chitrál in three days.

Another route into Badakhshán, practicable for beasts of burden, and that pursued by caravans of merchants and traders, is by the Más-túch Pass—so called from the town of that name—and by descending from thence, along the banks of another small stream, rising on the northern slope of the mountains bounding Lower Ḳásh-ḳár to the north-east, which falls into the Panj at Issár (His-ár?) in the

* Elphinstone's Caubul: Vol. 2nd, Appendix D. pp. 453.

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canton of Wákhán.* This is the main road between Badakhshán and Gilgiṭṭ to Kashmir. The Yárkand road branches off from Issár to the north, through the *darah* or valley of lake Sir-í kol† over the table land of Pámír.

Further west there is another Pass into Badakhshán, called "*Kotal-i-Ḳuḳán*," or the "Defile of Mischief." This road winds along the face of tremendous precipices, and through frightful defiles, by which the hamlet of Gáo-kháṁah (signifying "Cow-house" in Persian,) lying in a plain, may be reached in two or three days. Further north is Rabáṭ, ('Robat' of Wood) on the Wardoj river. A route into Káfiristán joins the above road amongst the defiles of Hindú Kush, by which the districts held by the Kámúz, Askín, and Ashpín tribes of Si'áh-posh Káfirs may be reached in from three to four days, without much difficulty, in the summer months.

To the north-east of Upper Ḳásh-ḳár (which some also term Shaghnán), is Shágat, distant five *manzils* or stages. It is also called Ḳásh-ḳár, so I am informed; but the people are different in their manners and customs, and are under a different ruler.

The river of Chitrál or Ḳásh-ḳár, also known as the Cheghán-saráe, from the small town of that name, near which it falls into the Kámah, or Kunar, as it flows south to join the river of Kábul, appears—as I have already pointed out at page 3—to have been long confounded with the Kámah or Kunar, of which it is only a feeder. The Chitrál river rises at the "Taláb-i-Níl," or "Cerulean Lake."‡ This lake must not be mistaken for lake Sir-i-kol,§ from which the Panj, or

* "At Issar 10,000 feet, on the termination of the main valley of the Oxus, the road divides into two, which when beyond Killah Panj bore respectively E. 20° S., and N. 40° E. The former conducted to Chitral, Gilgit, and Kashmir, and the latter across the table-land of Pamir to Yarkand." Wood.

† "There is a Pass called Mustodj, or Mastuch, which joins the valley of Wakan (Wákhan). I suppose that the name may be extended to the mountains bounding Chitral on the eastward, as I was told that after crossing the Mastuch Pass, the traveller descends with a stream for several days until he reaches Chitral, the country of Shah Kator." Vigne: "Travels in Kashmir:" Vol. II. p. 309.

‡ "An individual who had seen the region between Wakhan and Kashmir informed me that the Kunir (Chitral) river had its principal source in a lake resembling that in which the Oxus has its rise, and that the whole of this country, comprehending the districts of Gilghit, Gunjit, and Chitral, is a series of mountain defiles that act as water courses to drain Panir." "Wood's Journey to the Oxus."

"There is said to be a lake in Shaghnan, half a day's journey in circumference, which drains the country on the left bank of the Panj, as the Oxus is here called." Ibid.

§ *Sir* in Persian signifies the head, top, summit; great, highest, etc.; and *kol*, in the same language means a pond, a reservoir, a lake, and so forth.

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main branch of the Oxus takes its rise; for the Taláb-i-Níl lies much further to the south. The river of Ḳásh-ḳár flows from it, and having passed Más-túch on the west, flows towards the south and south-west, through the two states of Ḳásh ḳár, and joins the Kámah or Kunar at Cheghán-saráe, as before stated. The existence of this lake was mentioned to Lieut. Wood by natives of Badakhshán, and it is also corroborated by the account of Moorcroft and Trebeck,* who call the lake by the name of Hamú-sar; but which, if it is a Persian name, as it appears to be, would rather seem to refer to that of "Sir-i-kol," the source of the Oxus, and then, interpreted, would signify the "Head or Source of the Hamú," which latter word, in all probability, is more correctly Amú, (امو) the name by which the Oxus is known to the natives of these regions.

North of Más-túch all the streams take a northerly course towards the Oxus and the river of Yárkand; whilst those south of Más-túch run towards the south, and are, ultimately, absorbed into the Indus.

From Upper Ḳáshḳár, the road to Gilgiṭṭ lies to the south, south-east; and that place is seven stages distant. From thence, pursuing a westerly route, Little Thibet is reached in another seven stages. The Kashmír route lies to the south of Thibet, and is distant about eight stages.

The dress of the people of Upper and Lower Ḳásh-ḳár, from the severe nature of the climate of the country, consists of a number of garments worn one over the other. They are made with immense sleeves; and, when on, lie in a number of folds or rolls. The dresses of the women are made longer and more loose than those of the men, and assimilate, in some measure, to the dress worn by the females of Kashmír.

The men are tall and well made; and the females are remarkable for their beauty,† which is said to surpass that of the Sí'áh-posh women,

* "Westward from Gilgit is Chitrál, distinguished as Upper and Lower. The latter, which is nearest to the Hindu Kush, is situated on a river flowing from a lake called Hamú-sar, and ultimately falling into the river of Kábul."—Moorcroft and Trebeck.

† "Close to Gand'hamádana, along the banks of the Apara Gándicá, or western Gándicá, is the country of the Cetu-mála, 34,000 Yojanas in length, and 32,000 broad. The Cetu-málas are mighty in deeds, strong, and powerful, the women bright *like the Lotus flower*: and whoever sees them, falls in love with them."—Wilford, on the Sacred Isles of the West: Asiatic Researches Vol. VII., page 359.

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who are so much celebrated for their good looks. A great many people are yearly sold into slavery; and a boy or a girl can, generally, be purchased for one hundred rupees. The more comely of the females fetch high prices, varying from five hundred to one thousand rupees. Two or three hundred slaves are sent annually into Túrkistán, by the Darwán Pass of Badakhshán, and constitute one of the chief exports from the country.

The imports consist of salt, which is very expensive; chintzes and other piece-goods of low price and coarse texture from Yárkand, Pes'háwar, and Badakhshán, together with boots and shoes, metals, and a few pearls and precious stones from the latter country; tea, sugar, and horses from the former state; sundries, consisting of needles, thread, scissors, knives, combs, &c., of rough workmanship, from Kashmír, and Pes'háwar; iron from Panjkorah; *gur* or coarse sugar, spices, medicines, matchlocks, swords, ammunition, and copper cooking utensils.

The other exports besides slaves, are unbleached silk, the produce of the country, and known amongst the traders of Kábul and other parts of Central Asia, as *koráh** *Ḳásh-ḳárí;* shawls also the peculiar manufacture of the country, the woof of which, termed (پود) *púd*, is sometimes of a coarse description of silk called *patt*† by the Ḳáshḳáris, and sometimes of cotton, and the warp called (تار) *tár*, of pure silk. These are rather expensive, ranging in price from twenty rupees; but a cheaper description is manufactured, the woof of which is of wool, and the warp of cotton, and which can be procured as low as two rupees each; *choḳahs*, or cloaks with sleeves, the cloth of which is woven from *pashm*, a species of wool or fur, of three different colours, with which all animals, even dogs, are provided, in this cold region, but more particularly goats. It is called shawl-wool. These garments vary in price from one to twenty rupees.

The peculiar method of weaving these mantles or Ḳásh-kári shawls brings to mind a passage in Pliny with regard to the fabric from which the Coan vests, so much esteemed by the Greeks and Romans, were made. Heeren in his "Asiatic Nations," also refers to the subject in the following terms. "The first Grecian author who has made mention of the silk-worm, and described its metamorphosis, is Aris-

* In Hindí means "unbleached" or "raw."

† The terms پود and تار are Persian. The Sanskrit for silk is पट्ट patt.

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totle in his Natural History. His account, however, does not tally with the silk-worm known in Europe; and it is probable that he had another species in view, though his commentators are by no means agreed on this point. He tells us that the web of this insect was wound off by women, and afterwards woven; and names a certain Pamphyle, of Cos, as the inventress of this art. Whence then was the raw material derived? The Grecian philosopher does not expressly inform us, but Pliny,* who has translated his works, and perhaps had a more accurate copy before him than we possess, speaks of Assyrian,† that is, Asiatic silk, and interprets in this manner the obscure expressions of Aristotle. The Grecian women, he says, '*unravel the silken stuffs imported from Asia, and then weave them anew;* whence that fine tissue, of which frequent mention is made by the Roman poets under the name of *Coan vests.*' A celebrated scholar understands this passage as implying that all the Asiatic garments, described as silken, were in fact *only half composed of silk*, and supposes that the Grecian women *separated the two materials of which they consisted, and that the cotton woof having been withdrawn, the texture was filled up with silk alone.*"‡

Ḳásh-ḳár is, by no means, a poor country; in many places it is well sheltered; and the climate, on the whole, is temperate, but, in winter, it is severe. The soil is rich and fertile, producing much grain, including great quantities of rice. European fruits, such as apples, pears, apricots, plums, peaches, etc., are produced in great quantities, as well as excellent grapes, from which vast quantities of wine are made; for the Ḳásh-ḳáris, although professing Muhammadanism, are, like their neighbours, the Si'áh-posh Káfirs, and the people of Gilgiṭṭ, notorious for their wine-bibbing propensities.

The herds and flocks, particularly the latter, constitute the chief wealth of the inhabitants of Ḳásh-ḳár and the neighbouring petty states, and for which they have been celebrated from remote antiquity.§

* Pliny, XI. C. 22 and 23.

† Bakhtrá and the regions between the Indian Caucasus and the Indus were included in the Assyrian empire.

‡ Foster, De Bysso Antiq. p. 16.

§ "In the mountains also of northern India, the district of Belur (Bílauristán), or vicinity of Cashmire, were found then, as at present, large flocks of sheep which constituted the wealth of the inhabitants." Ctesias: XIII. 22.

There is no fixed rate of taxation in either of the two states; sometimes a fifth or a fourth of the produce is levied; but, at times, as much as one half has been collected.

Trade is chiefly carried on by means of barter, money being very scarce.

The language of both Upper and Lower Ḳásh-ḳár contains a great proportion of Persian words. This, however, is no matter of surprise, when we consider that these countries formed a portion of the extensive empire of the Persians. The people are said to express themselves with much circumlocution.

The Venetian traveller, Marco Polo, appears to have visited Ḳásh-ḳár, which he thus briefly describes. "At length you reach a place called Kásh-ḳár. The province is extensive, and contains many towns and castles, of which Ḳásh-ḳár is the largest and most important*** Besides the Muhammadans, there are amongst the inhabitants several Nestorian Christians." The matter of the Nestorians is a somewhat difficult one to solve. The Sí'áh-posh tribes, inhabiting a portion of the valley of the Ḳásh-ḳár river, may probably be the people he referred to; and whom, differing widely in manners and customs from the Muhammadans of those parts, he, without due inquiry, and chiefly, if not solely, on native report, may have fondly concluded to be Christians.

Independent Afghán States.

The petty states at present held by the powerful and numerous Afghán tribe of Yúsufzí, the most turbulent, and the most independent of the Afghán clans, who have reduced the original inhabitants of these countries to a state of vassalage since their exodus from Kábul in the reign of Mirzá Ulagh Beg, grandson of Tímúr (the account of Herodotus and the Πάκτυες of the Pes'háwar oracle notwithstanding) in which they themselves reign in feudal turbulency—consist of Panj-korah, including that part of the "*Sama'h**—above the junction of the Panj-korah river with the river of Suwát, called the district of Talásh; Suwát; Buner; and Chumlah; the whole lying to the north of the British possessions, part of which includes the south-western portion of the Sama'h, lying nearest to the left bank of the Landḍaey or Panj-korah river. I have given a description of the valley of

* A Pus'hto word signifying "a plain."

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Suwát, in a late number of the Journal. The other two districts are, comparatively, little known.

Panj-korah.

Panj-korah, a compound word, signifying "five houses or clans," from the Persian "*panj*," "five," and the Pus'hto, "*kor*," "a house, clan, tribe, etc.," is so called from the five clans of the Malí-zí subdivision of the great Afghán tribe of Yúsuf-zí, which originally peopled it, after the conquest of those parts, north of the Kábul river, by the Afgháns about the beginning of the sixteenth century. Those clans were, Pá'índah Khel, Doshah Khel, Sarandí Khel, Sulṭán Khel, and Pa'í Khel. At present there is a slight difference, from the fact of other clans having sprung up, during the course of so many years.

Panj-korah is the most important, and most considerable of these minor independent Afghán states, lying almost immediately under the southern slopes of Hindu Kush. It runs in a north-east and south-west direction; is of oblong form, being about ninety-five miles in length, from north to south; and forty-eight from east to west. It is bounded, north by the two Ḳásh-ḳars; south by Tál-ásh, and the Pes'háwar district; north-east by Bilauristán, Gilgiṭṭ, and other little known principalities towards the upper sources of the Indus; south-east by the Suwát valley; west by Káfiristán; and south-west by Báj-áwṛṛ, a district belonging to the Tar-kolání tribe of Afgháns. It is surrounded on all sides, and is crossed in various directions, by lofty hills, inclosing as many valleys through which the principal rivers flow, fed by numerous smaller mountain streams. The hills are clothed with dense forests of fir, pine, oak, wild olive, and other trees indigenous to these alpine regions.

The principal rivers, that intersect Panj-korah like the ramifications of a leaf, are, the Lahorí—also called the Dír river (rising on the southern face of the Lás-púr mountains separating it from Ḳásh-ḳár, and giving name to the pass leading into the latter country, the road winding along its banks) which flows nearly due south, passing the town of Dír, the residence of the ruler, for about twenty miles. It is then joined by the Tal from the north-east, which takes its rise in the hills bounding Yasín to the west. This stream has the longest course, and its Pus'hto name, signifying "always," "ever," "perpetually," etc., may refer to the fact of its never becoming dry, as some of the smaller rivers are liable to become in the winter months

The other streams in succession are, the U-sherí, whose volume is the most considerable of the Panj-korah rivers, and the Kárah, both of which run in an almost parallel direction to the Tal, with intervals of from twelve to twenty miles from each other; and the Biráh-wol from the north-west, whose source is in the lofty hills held by the Sí'áh-posh Káfirs, separating the valley of the Ḳásh-ḳár or Cheghán-saráe river from the Panj-korah district. All these (except the Biráh-wol) unite near the village of Rabáṭ, and after flowing south for about another twenty miles, under the names of Panj-korah, Usherí, and Malízí river, receives the small rivers of Bábá Ḳarah, Jandáwal, and Bájáwṛṛ from the north-west, which, after watering the small valleys bearing those names, unite with the Biráh-wol river before they fall into the main stream in the district of Tálásh. About twenty-six miles further south, the Panj-korah river receives, near the village of Khwadarzí, the river of Suwát—the supposed Suastus of the ancients—a stream of great rapidity in many places, and of considerable length and volume—from the north-east. It rises in the hills bounding Gilgiṭṭ on the west, and runs, for some distance, nearly parallel to the other streams on the same side.* The united waters now become a clear, deep, and rapid river, known as the "Landḍaey Sind," in Pus'hto signifying "The Little" or "Lesser River" (in reference to the Indus, which is called the "Abá Sind," or "Father of Rivers," in this part of its course), which, lower down, near the village of Abází, separates into several branches, which at Hasht-nagar, in the Doábah of the Pes'háwar district, again unite, and, at length, disembogues into the river of Kábul, near the village of Noh-satah, about forty-five miles from its junction with the Suwát. The Panj-korah or Landḍaey river is supposed to be the Guræus of the classical authors, and is the most considerable river of these regions after the Kábul.

The Panj-korah district slopes down considerably from north to south; hence the rapidity of the rivers, the main streams of which, in the summer months, increase so much in volume and rapidity on the melting of the snows, as to become impassable altogether, except by means of rafts, and even then, with considerable difficulty and danger. The Lahorí, or Dír, becomes dry in the winter months; and the other lesser rivers, or *khwaṛṛs*, as they are termed in the Afghán

* See my "Account of Suwát," in the Journal for 1862, page 227, in which an account of the upper sources of the Suwát river will be found.

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tongue, viz. the Biráhwol, the Tal, the Kárah, and the Báj-áwṛṛ river and its feeders, are generally fordable at that season.

The whole of these streams give names to as many *darahs*—long, narrow, fertile, and pleasant valleys, inclosed by ranges of lofty hills running in a parallel direction to each other, which are again intersected, in opposite directions, by hills less lofty, and valleys still smaller, each of which has its own little stream, acting as a feeder to the larger ones, and generally its village or small hamlet.

In the winter months, the hills are covered with snow half way down their sides; and in the valleys also, as far south as Dír, snow falls in considerable quantities, and lies on the ground for many days, and sometimes even, for weeks together. Lower down, they have copious showers of rain in the winter season.

The whole of these valleys, as well as the extensive level tract known as the "Sama'h," (except some parts of the latter, which approach the *Merra'h*, or Desert) are fertile, and the land is carefully cultivated. It produces an abundance of grain, chiefly wheat and barley; but *ju'ár* (Holcus sorgum), and *bájrá* (Holcus spicatus), are produced in smaller quantities.

The other principal productions are, cotton to a small extent, sufficient for home consumption; tobacco, and sugar-cane, which are grown in the more southerly parts. Most agricultural produce is exceedingly cheap, and is calculated to be eight times more so than at Kábul. When at the dearest, eight Kábul *sírs* of wheat—equal to about 88 lbs. English—sell for one *rupee* or two shillings.

Many European fruits are also produced in considerable quantities and some wild, but of no great variety. The former consist, chiefly, of apples, pears, and a sort of plum. The hills and valleys, in many places, are also clothed with several sorts of wild flowers, indigenous to these northern climates.

The land, in the more elevated parts, depends solely on rain for moisture; but in the valleys, the irrigation is artificial wherever the water of the numerous streams can be conducted. The chief harvest is the *khurif* or autumn; and but little corn is sown in the spring months.

The northern part of Panj-korah, where the climate is severe, is somewhat thinly inhabited; but towards the south the country is densely populated.

The people, who depend chiefly upon tillage for subsistence, also possess numerous herds of cows and oxen, goats, and buffaloes. Sheep are met with in great numbers, and never reach a higher price than three *rupees*, or six shillings. Lately, I find, they have been brought to Pes'háwar for sale, in considerable numbers. A good buffalo can be purchased for from twelve to twenty *rupees;* but cows constitute their chief wealth. Loads are mostly carried on the backs of oxen and asses. Notwithstanding that fodder is abundant, horses and mules are by no means common; but some few of the former animals are kept for military purposes. Camels are seldom seen in the country.

One-tenth of the agricultural produce is received by the ruler. Cattle are not subject to any tax; but a capitation, or house tax is levied on each house at the yearly rate of three *rupees*.

The *rupee* in general currency throughout the country peopled by the Yúsufzís, is the old Herát coin, worth about twenty-five per cent less than the East India Company's *rupee*, which is also in circulation, since the annexation of the Panjáb, to a limited extent.

From the bounds of the village of Panj-korah to that of Ushírí, grain is sold by weight; but beyond, a measure, called *ao-ga'í* in Pus'hto, is used instead. The *sír* of Panj-korah is one-fifth less in weight than that of Kábul; and the *ao-ga'í* is equal to three quarters of the Panj-korah *sír*.

The present* prices for articles of general consumption are at the following rates:—Wheat, seven Panj-korah *sírs* the *rupee;* barley eight *sírs; shálí* or unhusked rice, eight *sírs: ju'ár*, seven *sírs;* salt, brought from Pes'hawar, six *sírs; roghan* or clarified butter, one *sír; gur*, coarse sugar, brought from Pes'háwar and Jelálábád, one *sír* and quarter; honey, one *sír* and a quarter; cotton, five-eighths of a *sír*—about eighteen ounces English; iron three *sírs; ká-dí*—the coarsest description of cotton cloth—eight Lam-ghán yards.

A few articles, the produce of Hindústán, are imported; but the chief imports, which consist of articles of apparel and clothing of various descriptions, and a little indigo, are brought from Pes'háwar by the traders of that city and district, numbers of whom visit the country, and take back in exchange, iron, honey, and *roghan* or clarified butter.

* This paper was written a few years since: the prices may have therefore altered, and allowance for any errors must be made accordingly.

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There are a number of iron mines throughout Panj-korah, from which all the neighbouring countries are supplied. Some are situated in the Lás-púr mountains, and in the neighbouring hills of Biráh-wol, but the most extensive mines are in the Aw-shírí and Ḳárah *darahs*. In fact the whole of the Panj-korah district teems with iron and galena (called *surmah* or black antimony by the Afgháns), and there is no doubt but that it contains other even more valuable minerals.

Great quantities of yellow soap are made from the fat of sheep and goats, at the village of Gúna-ṭir, where all the houses, with but few exceptions, are provided with oil-presses and machines for boiling the soap, which sells at the rate of five *sírs* the rupee. This village supplies the whole of the surrounding hill countries with this necessary. It is held in great estimation as being free from adulteration with *jú'ar* flour and the like ; and is pure fat and potash.

There is a considerable trade carried on between the districts to the south-east and west, as well as with Badakhshán, Ḳásh-ḳár, Yárkand, and other places in Chinese Túrkistán, by menns of *káfilahs* or caravans. The route to the latter countries is through the Lahorí Pass, near the town of Dír, where the chief of Panj-korah resides ; and where he imposes a small tax or transit duty on merchandize. Travellers and traders are treated with great kindness and hospitality throughout the Panj-korah district ; and with the exception of the independent tribes of the Sí'áh-posh Káfirs (who are not subject to the ruler of Lower Ḳásh-ḳar) who, at times, infest the Lahorí Pass, the roads are safe, and the honesty of the people is so great, that the trader may generally penetrate into the remotest valleys, and in the hilly tracts, without danger of being molested by thieves or robbers.

The *darahs*, or valleys to the east of the main stream of the Panj-korah river, which divides the district from north to south, together with the names of the villages, clans occupying them, and names of their *Kad-khudás* or head-men, are as follow.

Shakolacy Darah.

Village.	*Clan.*	*Chiefs or Head-men.*
Kaṛah,	Sháhí-Khel,	Zardád Khán.
Deh Harún,	Shahí-Khel,	Maæsúm Khán.
Koṭ-ki,	Shahí-Khel,	Hyder Khân.

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Village.	*Clan.*	*Chiefs or Head-men.*
Karí,	Pá-índah-Khel,	Saæd-ullah Khán, brother of the Chief of Panj-korah.
Shakolaey,	Núrah-Khel,	Aiyúb Khán.

TÍMÚR-KALAH DARAH.

Tímúr kalah,	Núrah-Khel,	Sirdár Khán.
Khún Koh,	„ „	Mohsan, and Ghaffár.
Dán-wah,	Akhúnd Khel,	
Char-pírah,	Nasr-ud-Dín Khel,	Muhammad Khán.
Shahr,	„ „ „	Sarwar Mí-án.

Mían-mándah Sáhib-zádahs, or descendants of some holy man.

RABÁṬ*-I-MUHAMMAD KHÁN DARAH.

Sám-rí,	Pá-índah Khel,	Gul Khán.
Rabáṭ,	Nasr-ud-dín Khel,	Mahabbat Khán.
Kánj-lah,	Mí-án Khel,	Aká Sáhib.

KÁW-NÍ DARAH.

This *darah* contains only one village, named Dilkháh, but there is a number of small *bándahs* or hamlets, some of which do not contain more than a few families. This valley contains altogether about a thousand houses. The people are Pá-índah Khels, and the headman for the whole is nominated by Ghazan Khán, the chief of Panj-korah.

MALAH-KAND DARAH.

This *darah* is held by people of different clans. The hamlets are very small, and the whole *darah* may contain about eleven hundred houses.

TÚRMANG DARAH.

Akhkrám,	Pá-índah Khel,	Suyed Rahmán.
Dúd-bá,	„ „	Sher Æalé Khán.

There are also several other smaller villages or hamlets containing a few families.

KÁRÚ DARAH.

This *darah* is inhabited chiefly by families descended from the original inhabitants of the country, who live in a state of vassalage to their Afghán conquerors. There are also a few Yúsufzís residing in it, belonging to the clans already mentioned.

* Arabic for a caravansaráe.

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Village.	*Clan.*	*Chiefs or Head-men.*
	Na-hák Darah.	
Nahák,	Pá-índah Khel,	Chirágh Sháh.
Wáraey,	„ „	Bázúe.
Izghánch,	Gudaey Khel,	Allah Yár Khán.
Dárojnah,	Sulṭán Khel,	Suyed Amír.
	U-sherí Darah.	
U-sherí,	Sulṭán Khel,	Kází, Æabd-ur-Rahmán.
Jabar,	„ „	„ „
Kandí-kár,	Mí-án Khel,	Saiyid Ádam.
Kázan,	„ „	„ „
Bíbí Yáwarah,	Pá-índah Khel,	Æabd-ullah Khán.
Mír Al-más,	„ „	Zaríf Khán.
Tar-pah-tár,	„ „	Hajúm Khán.
	Bar (Upper) U-sherí Darah.	
Bar U-sherí,	Pá-índah Khel,	Anwar Sháh Khán.
Damah-zár,	„ „	Ahmad Khán.
Pálám,	„ „	Fazal Sháh.
Sam-koṭṭ,	„ „	Sher-i-Zamán.
Báṭil,	Mí-án Khel, or de-	Khair-ullah Mí-án.
Bar-kand,	scendants of Akhúnd Darwezah, and his family,	Karím Dád, a direct descendant of the celebrated Akhúnd Darwezah, author of the Makhzan Pus'hto.*
Kor-koaey,	„ „	Mí-án Nazím.
Násht-ámal,	„ „	
Habíbí.	„ „	
Kamán-gar,	Núrah Khel,	Hasíb.

This last mentioned village derives its name, signifying, in the Persian language, "Bow-maker," from the fact of the first inhabitants having been makers of that weapon, for which their descendants are still celebrated.

Zarah-Khel Darah.

This valley contains a number of small hamlets having but few inhabitants. The head-man is appointed by Ghazan Khán, the chief.

* For account of his writings, see my Pus'hto Grammar.

Drál Darah.

This valley is very secluded, being inclosed on all sides by lofty hills; and the hamlets are very small. The people pay a small tax to Ghazan Khán.

The following *darahs* and villages are situated to the west of the Panj-korah river.

Háráng Darah.

This valley contains a number of small hamlets, many of which are now in ruins and deserted. The zíárat or shrine of a saint, named Ghází Sáhib, is situated in this *darah*.

Shúh Darah.

The river of Bájáwṛṛ, which rises in the hills to the west of Panj-korah, flows through this *darah* from west to east; and after receiving the Jandáwul and Bábá Ḳarah rivers, from the valleys bearing those names, joins the Biráhwol. The *darah* of Biráhwol, through which the last named river flows, before entering the *darah* of Shúh, lies higher up, and will be noticed in its proper place.

There are numerous small villages on both sides of the river, in this valley, the whole of which have numerous gardens and orchards. Ghazan Khán of Dír, the chief, appoints the head-man.

Báhá Ḳarah Darah.

This valley contains small hamlets only. The people were formerly independent, and were under a chief or head-man of their own, named Aslam Khán; but several years since it became dependent on Ghazan Khán, who appoints a head-man of his own.

Biráhwol Darah.

The chief place in this valley is Biráhwol, hence its name, and that of its river. It is the residence of a petty independent chief, named Muhammad Æalí Khán, of the Afghán tribe of Tarkolání, which possesses Bájáwṛṛ; and, therefore, although included in Panj-korah, it can scarcely be deemed a dependency of it, as the chief pays no tribute to Ghazan Khán. There are several iron mines in this valley, which have been worked for centuries past. There are also several hamlets, but they are small in size.

Maídan Darah.

The only village of any size, contained in this *darah*, is Khemah, inhabited by Sháhí Khels, of whom Bárún is the head-man. There

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are, however, numerous small hamlets. The people have the name of being the only robbers in the district of Panj-korah, which may be accounted for, in some measure, from the fact of this valley being the most difficult of access in the whole district.

Panj-korah Darah.

Bar (upper) Panj-korah,	Sulṭán Khel,	Sher Æalí.
Kúz (lower) Panj-korah,	„ „	Págul.
Páṭ-áw,	„ „	Mardán.

Dír, the residence of the chief.

Dír, the capital of the Panj-korah district, contains about two hundred houses, not including the citadel, and some twelve hundred inhabitants. It is protected by a considerable fortress or citadel, situated on a high mound or eminence, a spur from the Lás-púr mountains. The walls, which are substantially built of mud and stone, are about four hundred yards long, three hundred in breadth, and twelve yards in height; and are flanked by four towers or bastions. Within the citadel, which is kept in excellent repair, there is a large mosque, besides several other buildings, including the residence of the chief Ghazan Khán, and his numerous family, together with his immediate followers, constituting his standing army, the whole of whom, with their families, amount to about two thousand five hundred people.*

There are, in this, as in the other valleys, numerous small hamlets.

Shamúr-gar Darah.

Shamúr-gar,	Pá-índah Khel,	
Khír,	„ „	Allah Yár Khán.
Amlúk-nár,	The people are the descendants of the aboriginal	
Jabalak,	inhabitants of the country, and called by the	
	Yúsufzís *raæyats* (vassals) and *fakírs* (villains).	

The two smaller *darahs* of Tahánkí and Dúdbá are contiguous to this valley, and open into it. They contain a few hamlets.

The other chief places in the Panj-korah Darah, are Ghundí,† Chakyá-ṭan, Aroṭṭah Sín, and Panah-kút.

* Bábar calls this place Panj-korah, probably as it was the capital of the district. He notices it as follows. "Panj-korah lies a little above the middle of the slope of the hill. It is necessary, for nearly a *kos*, to climb up, laying hold of the ground." Memoirs, pp. 250.

† Signifying, in Pus'hto, a detached hill.

The chief *bázár*, or market towns, or marts of trade in the district are, Dír, Biráh-wol, Sam*-khál, and L'waṛṛ†-khál.

There are three other *darahs* dependent on Dír, or the Panj-korah Darah, viz. Ḳásh-ḳárí, so called from leading into Ḳásh-ḳár by the Láhorí Pass; Do-bundí, by the other Pass through which Ḳásh-ḳár may be reached in two stages; and Kanír. They all three contain some small hamlets at considerable distances from each other.

From the Maidan Darah towards the west, there is a route leading into Bájáwṛṛ; and another from the Biráh-wol Darah, in the same direction. There are also two principal routes into Suwát from the Panj-korah district; one through the U'-sherí, and the other through the Kárú Darah. Proceeding south from the villages of Tímúr-kalah and Kát-kalah, and passing through the small district of Tálásh (a short account of which will be found further on), the main road leads by Hashtnagar to Pes'háwar. It is good, and clear of obstruction, and is the only one by which guns could be taken into Panj-korah. Sulṭan Muhammad Khán, Bárakzi, the brother of Dost Muhammad Khán of Kábul (a person who is likely to cause us some trouble ere long, when the Dost shall have been gathered to his fathers), entered the Panj-korah district by this road, several times, whilst he was in possession of Pes'háwar.

Ghazan Khán of Panj-korah is the most powerful chief amongst the whole of the Yúsufzís, whether Yúsuf or Manḍar; and by his great abilities and foresight, has rendered himself, for many years past, respected by all the other princes and chieftains of these parts. He is on friendly terms with the chief of Bájáwṛṛ; and is in alliance with the rulers of Chitrál and Upper Ḳásh-ḳár. He is the son of Ḳásim Khán, mentioned by Elphinstone in his account of the kingdom of Kábul, son of Zafar Khán, son of Ghulám Khán, son of Akhúnd Ilyas; and belongs to, and is the chief of, the Pa-índah Khel branch of the Yúsufzí tribe, which is also known as the "*Akhúnd Kor*," signifying, in the Pus'hto language, "The Teacher's family or house." At the time these notes were made, three years since, Ghazan Khán was about seventy years of age, and has since probably died; but I have not heard of his decease.

The following tradition concerning the foundation of the family of

* Sam, level, flat.
† L'waṛṛ, high, lofty, etc.

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Akhúnd Ilyás, who lived in the reign of the Mughal Emperor Aurangzeb, is related by the people of those parts:—Akhúnd Ilyás, a Darwesh and God-fearing man, was blessed with two sons—Aiyúb and Ismáæíl. The former who was the elder brother, had occasion, one day, to give some admonition to the younger, which the latter was not inclined to listen to in future, so he left the paternal roof in disgust, and proceeded to Kábul; and although of tender years only, he succeeded in obtaining service with the Governor of that province. Here his cleverness and great talents attracted his master's notice; and he was advanced from one post to another, until, such was the confidence placed in him, he was admitted within the Haram-saráe,—the most private apartments.

One day, the Governor, who appears to have been, himself, under petticoat-government, had a dispute with his wife, which ended in her beating the ruler of the province with one of her slippers. Aiyúb happened to be present on that occasion; and it tended, in no small degree, to add to the shame of his master, consequent on such an exposure. In order to comfort the Governor, if possible, and soothe his irritated feelings, Aiyúb remarked, that the women of all countries are naturally violent in temper, as well as tyrannical in disposition; and, that in his own country they were more violent still, and had even been known to take the lives of their husbands. He therefore begged his master to take no further notice of his wife's behaviour, but to serve her after the same fashion in future, should she indulge in such fits of violence.

After this untoward occurrence, however, the Governor, fearing, no doubt, lest the matter might leak out, and that he should, consequently, become a laughing-stock amongst the people, took care to treat Aiyúb with great consideration, and never to be angry with him; in fact, he let him have his own way entirely. He accordingly rose in his master's favour more than ever, particularly when, after inquiries, he found that Aiyúb had faithfully kept his secret.

Aiyúb at length became desirous of revisiting his home and friends; and he was dismissed by the Governor of Kábul, with great honour, and loaded with presents, both in money and goods.

There being no mechanics or artizans in his own country, Aiyúb obtained permission from the Governor to take along with him from Kábul, a carpenter, a mason, a goldsmith, and a huntsman, together

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with their families, who settled in Panj-korah. Their children followed the occupations of their fathers, and their descendants are now a considerable community, much respected in the country. These people are known as *fakírs*, a name also borne by the aboriginals of those parts, subject to the Yúsufzí Afghans.

Aiyúb was also attended by a number of other followers; and shortly after he reached home, Akhúnd Ilyás, his father, who was still alive, called his two sons into his presence and said unto them: "Out of the goods of this world, I have but two things to bequeath—my sword, and my *kachkol*" (a wooden bowl, or a gourd, in which a Darwesh receives alms): "take your choice of them." Ismáæíl, the elder brother, chose the *kachkol*, and Aiyúb the sword; and soon after, Akhúnd Ilyás, who had attained a great age, was gathered to his fathers. The children of Ismáæíl practise austerity; and are seekers after "the truth"* unto this day. They have the credit of being very learned. Aiyúb, who kept up a small number of soldiers, at length, obtained the title of Khán amongst his countrymen, and acquired considerable power, which increased from generation to generation, up to the time of Ḳásim Khán, father of Ghazan Khán, the present chief, whose rule extended over twelve thousand families of the Yúsufzí tribe.

Ḳásim Khán was the father of three sons—Azád, Ghazan, and Saæd-ullah—by three several Yúsufzí mothers, each of different clans. Azád, the eldest, by some untoward and unfortunate chance, became the slayer of his father; and some time subsequently, was, in like manner, slain by the youngest brother Saæd-ullah, in retaliation. These events occurred during the short and stormy reign of Sháh Mahmúd, (son of Tímúr Sháh, and consequently brother of the unfortunates, Sháh-i-Zamán and Sháh Shújáæ-ul-mulk), over the kingdom of Kábul, about the commencement of the present century.

Ghazan Khán was possessed of prudence and foresight in no small degree. He also had great wealth; and succeeded, by degrees, in gaining over the people to his side; and with the support and assistance of the late Sháh Kaṭor of Chitrál, or Lower Ḳásh-ḳár, he was acknowledged as the chief of his tribe, and ruler of the whole country of Panj-korah. The former friendship with the late, has been continued with the present, ruler of Chitrál—Tajammul Sháh, son of Sháh Kaṭor. Ghazan Khán, however, is at enmity with his younger

* Súfí-ism: see my "Selections from the Poetry of the Afgháns."

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brother Saæd-ullah, who still continues at the head of some four thousand families. In the month of *Muharram*, in the year 1839, during our occupation of Afghánistán, some cause of dispute having arisen between them, they assembled their followers, and Ghazan Khán advanced against his brother; but the forces separated after a slight skirmish, in which from twenty to thirty of their people were killed and wounded.

The Panj-korah chieftain was on friendly terms with the late Government of Lahore, during the time of Maháráját Ranjít and Maháráját Sher Singh; and they were in the frequent habit of sending presents to each other. In 1839, when it was the policy of the late Ranjít Singh to conciliate the Panj-korah chief, he sent him amongst other valuable presents, a fine elephant; in return for which Ghazan Khán sent the Maháráját several fine Kohistání horses, and some other rarities, through Sulṭán Muhammad Khán, Bárakzí, who then held Pes'háwar of the Seikh ruler. During the time that the Neapolitan Avitabile was Governor of Pes'háwar for the Lahore Government, the chief of Panj-korah used to send him Chitrál slave-girls for his seraglio, besides male slaves, from the hill countries in his neighbourhood.

The regular paid troops of Ghazan Khán do not exceed two hundred men; but the *Ulúsí* or militia, or feudal retainers, amount to above ten thousand matchlock men; and they can be assembled on very short warning.

The chief subordinates of Ghazan Khán, or his ministers as they are termed, are, his son Ráhmat-ullah Khán, Suyed Mír Æalám, Ḳází Æabd-ur-Rahmán, of the Pá-índah Khel, and Æabd-ul-Ḳádir, who was formerly a slave, but has now become the Názir of income and expenditure.

It now remains to say a few words respecting the *Raæyats* or *Fakírs*, who are much more numerous than the Yúsufzís themselves. The greater part of them are the descendants of the aboriginal inhabitants whom the Afgháns found there when they conquered those parts at the end of the and beginning of the fifteenth century. They are also called Suwátís, and Degáns; and are, with the Shalmánís and other tribes, such as Hindkís, Awáns, Paránchahs and others, the original people of these parts. It is strange that those who say so much about Herodotus, and the Πάκτυες, who they contend are the

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Afgháns, do not first provide for these people, who were in those countries when the Afgháns conquered them, and had been there centuries previously. As I said before, the greater part of those people, now to be found in the country held by the Yúsufzís, are called Suwatís, and are the descendants of those who remained in their country* after it was conquered; a goodly number of Degáns; some Hindkís, who have emigrated from the Panjáb; a few Kashmírís, and Hindús, who are attracted by the desire of gain; and some members of other Afghán tribes who have been obliged to fly from their own people, and who thereby have become degraded to the rank of the *Fakírs* and *Raæyats*. The *Fakírs* cannot hold land, and are not considered equal to their conquerors, who live like Spartans among Helots; and they are not allowed to be present at *Jirgahs* or assemblies of the clans. They are subject to the person on whose land they dwell, who is styled the *Kháwind* or master. They pay him a small tax and are obliged to work for him gratis, for certain periods, like the *villains* in our own country in days gone by. The master can beat, or even take the life of his *Raæyats* or *Fakírs*, without being questioned for it. But, at the same time, they are sure of every protection from their *Kháwind*, who would not, at the risk of his life, permit any other person to injure them. They may pursue any trade, work as labourers for their own advantage, or rent land as a *Bazgar*, and their master would have no demand upon them but for the fixed rent, a few taxes, and a certain share of their labour, as already mentioned; and, altogether, they are mildly treated. The *Kháwind* is deterred from ill-treating his *Fakírs* from the disgrace attached to oppression by the Yúsufzís, as well as the other Afghán tribes; and, moreover, a *Fakír* or *Raæyat*, if oppressed can remove to the lands of another Afghán, who would gladly receive, and give him protection, for there is a great competition for them. The number of clans and independent communities among the Afgháns are a great protection to these people; and should one of them receive any deadly injury requiring retaliation, he could revenge himself on his oppressor, and afterwards fly to another clan, or independent community, and demand protection, which would always be freely granted.

The *Kháwind* is not permitted to extort money from his *Fakír*; but he is allowed to levy a few fines, such as, on the settlement of a

* I shall return to the subject of the Suwátís in a future paper.

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Fakír upon his land, on a marriage among them, and on account of crimes, both of minor and more serious consequence. The amount of these fines are fixed by custom, and any attempt to extort more would be considered gross oppression. They are not forbidden to carry arms, but rarely do so.

Most of these people work as husbandmen, but some feed herds of cattle on the mountains, and some amass money by the profits of their labours as artizans; for an Afghán considers any handicraft trade a disgrace.

Tálásh.

Before bringing this paper to a close, I must give some account of the small district of Tálásh, which is also held by the Yúsufzís, and is considered as a part of Panj-korah, of which it forms the southern portion. It consists of the oblong strip of land through which the river of Panj-korah flows, after its junction with the river of Báj-áwṛṛ, as far as its junction with the Suwát. It is consequently bounded on the west by Báj-áwṛṛ, and to the south by the hills held by the Utmán Khel, an independent tribe of Afgháns. Tálásh is well watered, and is, therefore, exceedingly fruitful, well cultivated, and very populous for its extent. It exports a good deal of grain to Pes'háwar, the main road between which, and Panj-korah, Badakhshán, and the two Ḳásh-ḳárs, lies through it.

The chief towns, or large villages of Tálásh, with the names of the clans to which their inhabitants belong, and their head-men, are as follow.

Village or Town.	*Clan.*	*Chief or Head-man.*
Bágh,	Sháhí Khel,	Ghulám Sháh.
Shamsí Khán,	„ „	Afzal Khán.
Kambaṭṭa'í,	„ „	„ „
Amlúk Darah,	Raæyats or Fakírs,	
Mucho,	Núrah Khel,	Ghazan Khán.
Bájorú,	Sháhí Khel and Núrah Khel,	Sher Sháh, and Afzal Khán.

The village of Kamán-gar, the people of which are bow-makers by trade—hence the name of their village—is, sometimes, considered as belonging to the Tálásh district, but it is, properly speaking, in the U'-sherí Darah of Panj-korah. It has been, therefore, mentioned among the villages of the Bar (upper) U'-sherí Darah, already noticed.

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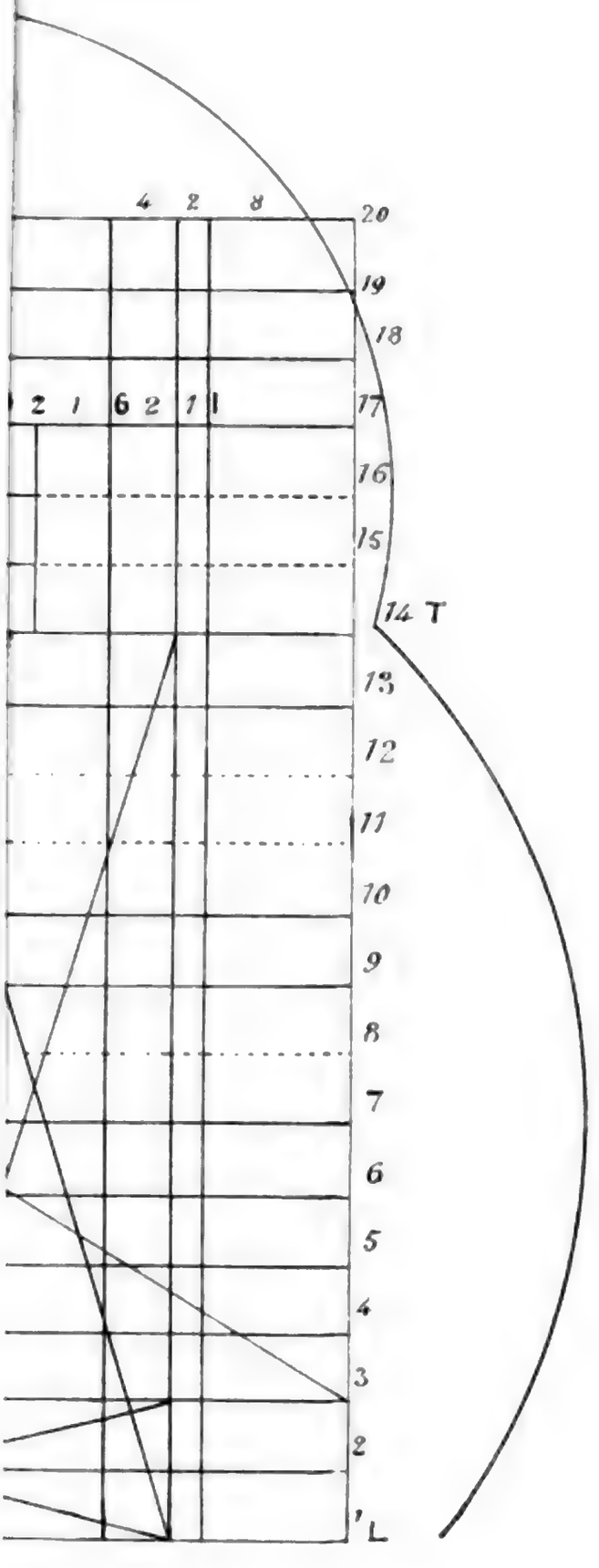
Plate I.

WING FIGURE.



CALCUTTA, APRIL, 1864.

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There are numerous small hamlets in Tálásh, inhabited by people of the Núrah Khel, who constitute the most considerable number of its inhabitants.

The district of Tálásh is very rich in monuments of antiquity, consisting of domes or cupolas, on the face of one of which, I am informed, there are several tablets, half a yard long, and inscribed in an unknown character, said to be Yúnání or Greek, but probably Pálí. If Greek, the examination of these ancient monuments would, no doubt, throw an extensive, and clearer, light on the proceedings of the Greeks in these quarters, which are so mixed up with nonsensical fables, as to furnish ready tools in the hands of those ignorant of the antecedents of the Afghán nation, for working out their own theories.

On the System employed in Outlining the Figures of Deities and other Religious Drawings, as practised in Ladak, Zaskar, &c.

(Communicated by Capt. H. H. Godwin Austen, F. R. G. S., 2nd Assist. G. T. Survey of India.)

As I believe no notice has hitherto been taken of the above subject, and as I only accidentally discovered its existence when in Zaskar last summer (1862) I have been led to write a few lines regarding it; trusting that they may prove of interest to some, and add to our knowledge of the history and customs connected with the ancient religion of the Buddhists. I do not claim any new discovery in this paper, as others may have observed the method of drawing long since. It has a resemblance to that adopted by ourselves in teaching Figure Drawing, and it was when shewing this to a native draftsman of Shilar, a village near Padum, that he produced a sketch of a figure outlined as shewn in the accompanying plates, as also that of the "Churtun" or "Offertory Temple."

The system of the first shews a great amount of ingenuity in its details, but is far more intricate than our simple way, where more is left to the talent of the artist.

The Deity thus given as a specimen is Sakya Thubba, or Bhuddha.

The first line laid down is the perpendicular AB, to which a line (No. 20) is drawn at right angles, and on either side of AB on this line are laid off from a scale proportions equal to 12, 4, 2, 8, and lines parallel to AB drawn through these points. On the two outer lines,

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commencing at the 20th, parts equal to 4, 4, 4, 12, 4, 12, 4, 8, 4, 4, 4, 4, 4, 4, are laid off in the above succession, and the points connected by lines which will be all parallel to the 1st (No. 20). The square for the face is similarly formed by laying off from the same scale parts 6 and 2 on either side of X, the outer part 2 delineating the breadth of ears, and a part equal to 2 laid off on either side of Y defines that of the nose and mouth by lines drawn to X from those points.

The mouth is placed half-way between 14 and 15, and its width, as well as that of the nose, is defined by the lines XE_2 and XF_2. The arc of a circle described with a radius from centre of mouth to E_2 or F_2 defines the chin. The part between the lines 15 and 16 within the square DCEF is divided into four parts by horizontal lines, the lowest part (1) gives marking of nostrils, the third defines the eyes, the outer and inner corners of which are determined by lines drawn as in the accompanying plan.

The eye-brows lie on 16, as also the top of the ear, the long lobe of which reaches to 14 on a level with the chin. A curve from H_2 G_2 rising to 18 defines the crown of the head; the circular glory RST round which is described from O as a centre, between the eye-brows. A second glory (as it may be termed,) RK and LT is described round the body from the point P on line 7. These glories are in the paintings coloured differently. Lines from the intersection of I and 14, J and 14 to B form a triangle, and on 4, 5, 6 give the sides of the alms dish, resting on the palm of the left hand. Another triangle being made with its angles at Y and the points on the line KL where the perpendiculars through J and I intersect it, the nipples of the breast lie on its two sides where they are intersected by line 10. A third triangle, apex at AB_{17} to L_3 K_3 gives the slope of the thighs in a sitting posture, while again lines I_3 to J on KL, and J_3 to I on KL give direction of shin and instep to points of the great toes. On reference to the plates it will be seen that many other parts of the body are made to fall on the intersections of the different lines.

These figures are seen in every monastery painted on both canvass and silk, the latter being generally brought from Llassa; they are often remarkable both for their richness of colouring and sharpness of outline. Many similar figures scratched on flat stones are put as offerings on the Mani Walls and are to be seen all over the country, more especially in Zaskar.

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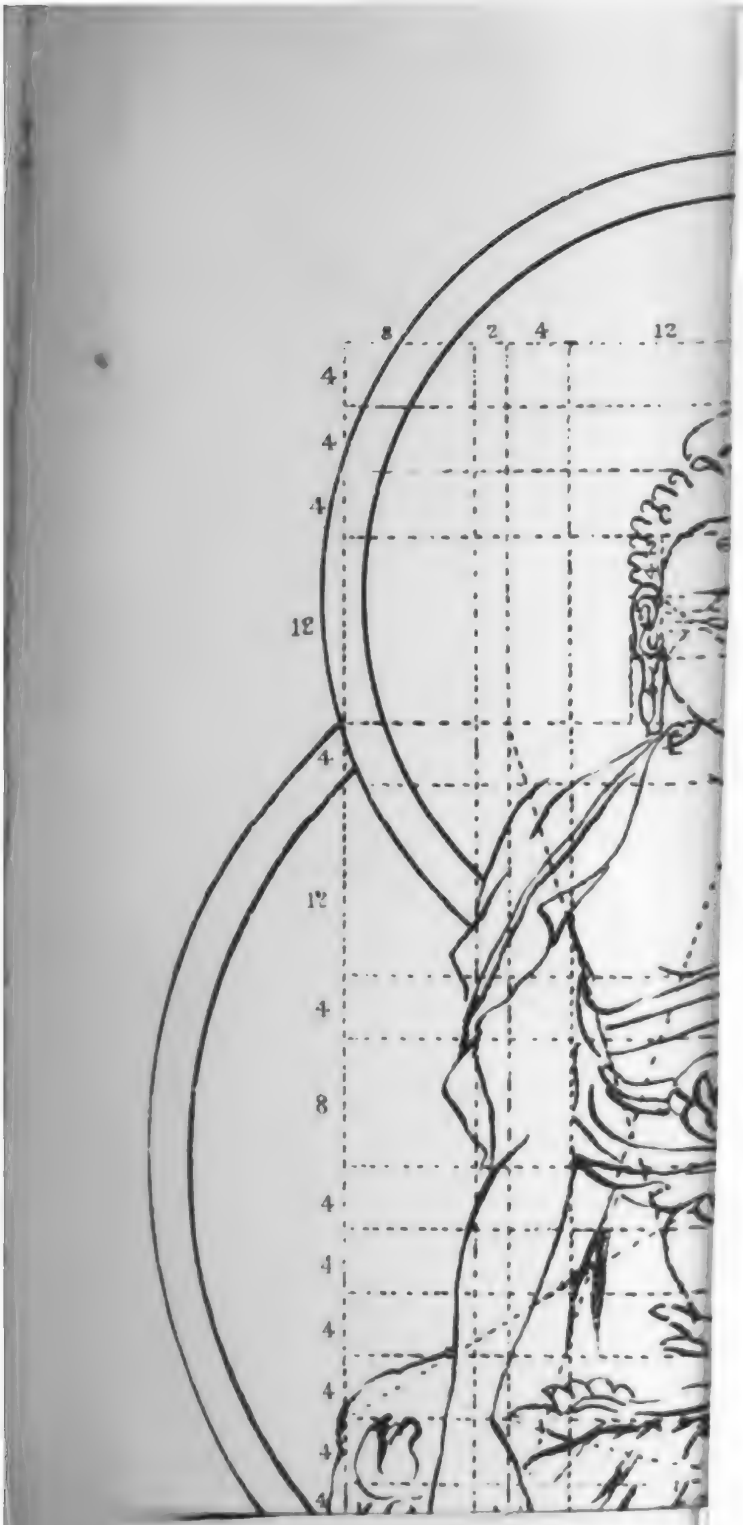

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Lith. by H M Smith. Surv. Genl. Office Calcutta April 1864

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PLAN

from native drawing of

CHOORTUN,

from ZASKAR LADAKH.

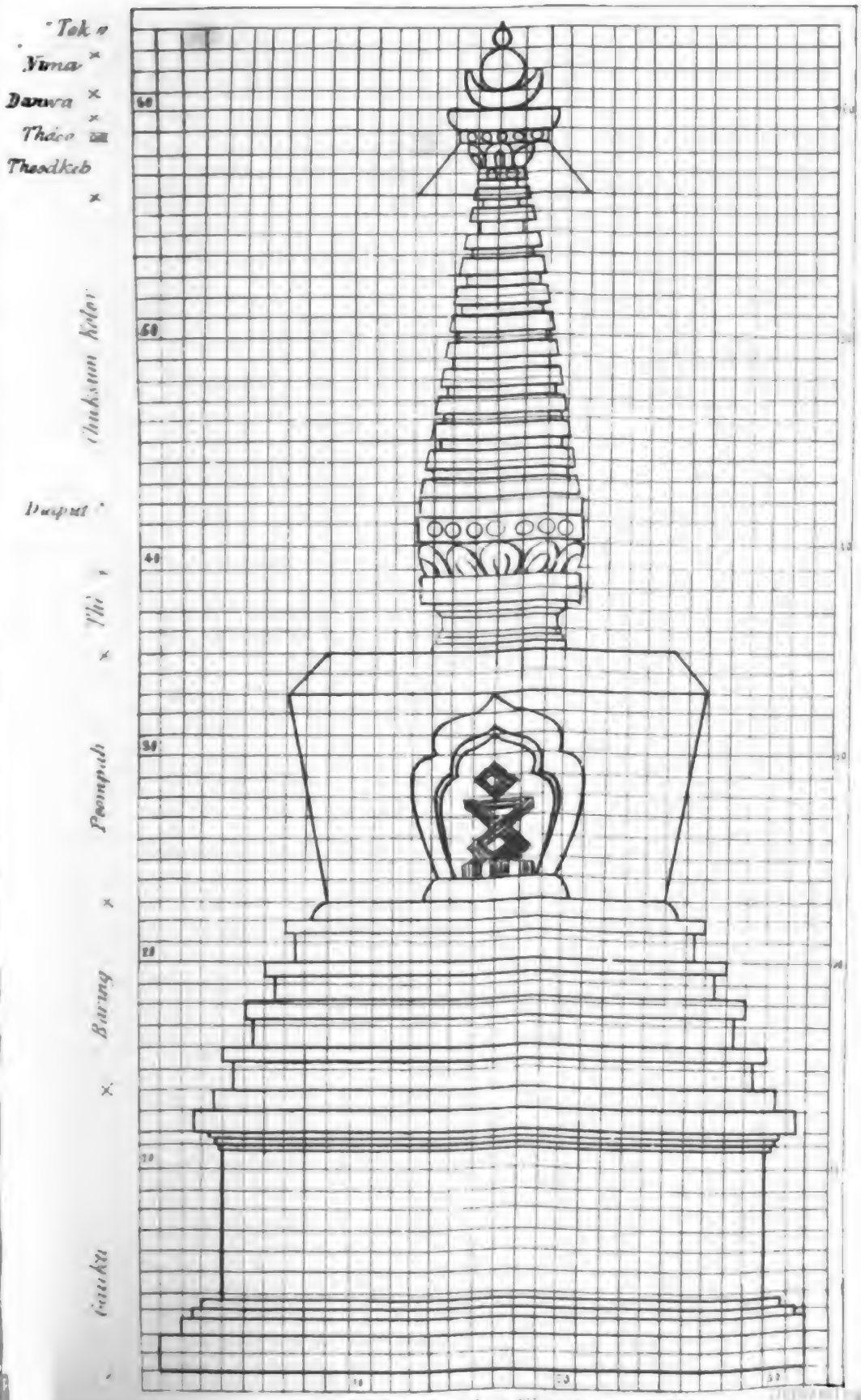

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Plate. IV.

OLD STONE FIGURES, DÈKOO near PADUM

ZASKAR

LITHOG BY H.M. SMITH, SURV. GENL'S OFFICE, CALCUTTA, APRIL, 1864.

The similarity of their proportions and cast of countenances is striking, and must be attributable to the above described mechanical mode of laying out the figure, which may probably be used all over Thibet.

I was unable to obtain copies of their many other deities, such as Chamba, Chandazik Grolma, (female), Chooshong, &c., but I imagine there is a like rule for drawing each; I shall try and obtain further information regarding them next season.

The drawing of the Chúrtún (Pl. III.) which I send is also taken from a native plan on which the measurements are given. I have entered the names of the different parts, which I find are not given in Cunningham's work on Ladak. The part called 'Chuksum' or 'Chugsum Kolor' always has, as its name implies, 13 discs, Chugsum meaning thirteen;—there is perhaps some reason for it, for when I shewed Cunningham's XXVIIIth Plate of a churtun to the Lhamas, they at once counted the number of discs and informed me that three had been left out. The letter in the centre is the syllable "Hun" which is brought into all the mantras repeated by the people.

These Churtuns are picturesque buildings, and reminded me much of the Pagodas in Burmah on a small scale, for in Ladak they are rarely over 40 feet in height, and are generally very much smaller. The sides of the lower portion are often adorned by cleverly modelled work in relief, representing some imaginary animal, between a man and bird, or a sort of griffin, with a border of scroll-work. The upper portion, "Thoodkeb," in the better kind of churtun is made of metal, and I was told that in former times gilt churtuns were to be met with in the neighbourhood of the large monasteries or Gonpahs. The churtun close under the palace at Leh is a good specimen and its name "Stunzin Num-gyal" is well known all over Ladak, so much so that a song has been written about it. At the monastery of Himis there is also a very pretty model, coloured white and ornamented with good gilt scroll-work, and inlaid with rough turquoises, carbuncles, agates, &c. There are a few more good ones in the same neighbourhood, but during the Dogra conquest of the country, many of the best religious buildings were destroyed, or more or less injured.

When surveying in the neighbourhood of Padum in Zaskar, I discovered in a field near the monastery of Sèni, several stone figures as shewn in the accompanying rough sketch (Pl. IV.) They had been set

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up on a slight curve, and the highest standing in the centre was about 7½ ft. high. Several had evidently disappeared, and with the exception of the two given on a larger scale (Pl. V.) they were very much worn and the features quite obliterated. I could obtain no information at the time as to what they were called. The Lhama with me from the monastery close by, called them Dekoo, said they were very very old and that no one knew who had made them. The head-dress was peculiar, nor have I seen it worn by any in that country at the present day. The smaller figure holds the Dorgè or Sceptre, which points out that they are of Buddhist origin. They are probably very early, dating from when that religion was first introduced into Zaskar; the rudeness and bad proportion of the figures display the handiwork of a people far behind the present race, who to all their drawings and modellings give a finish and exactness not usual even in the plains of India. I could discover no signs whatever of any inscription having been cut on either of the images,—the very worn state of the stone must have obliterated it, had there ever been any. Their age I must leave to be settled by those who are versed in the history of the early Bhuddists, and who may have noticed the curious ends projecting on either side of the head in other sculptures of the same period.

Note on a tank Section at Sealdah, Calcutta.—By H. F. Blanford, *A. R. S. M., F. G. S.*

I am indebted to Mr. H. Leonard the Government Superintending Engineer, and a member of this Society, for drawing my attention to a section exposed in the large tank now in course of excavation at Sealdah, and which seems to me of sufficient interest to be recorded in the pages of the Society's Journal. The tank is situated to the East of the Circular Road, between the termini of the Eastern Bengal and Mutlah Railways, and has been excavated to a depth of 30 feet below the normal surface of the ground, which is at that spot 14½ feet above the level of the low spring tides in the neighbouring canal, and 17 feet above that of the lowest spring tides of the dry season in the Hoogly river.* The bottom of the tank is therefore 15½ feet below the former, and 13 feet below the latter level,

* These levels are quoted from those given in the Report of the Municipal Engineer on the Main Drainage of Calcutta.

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Plate V.

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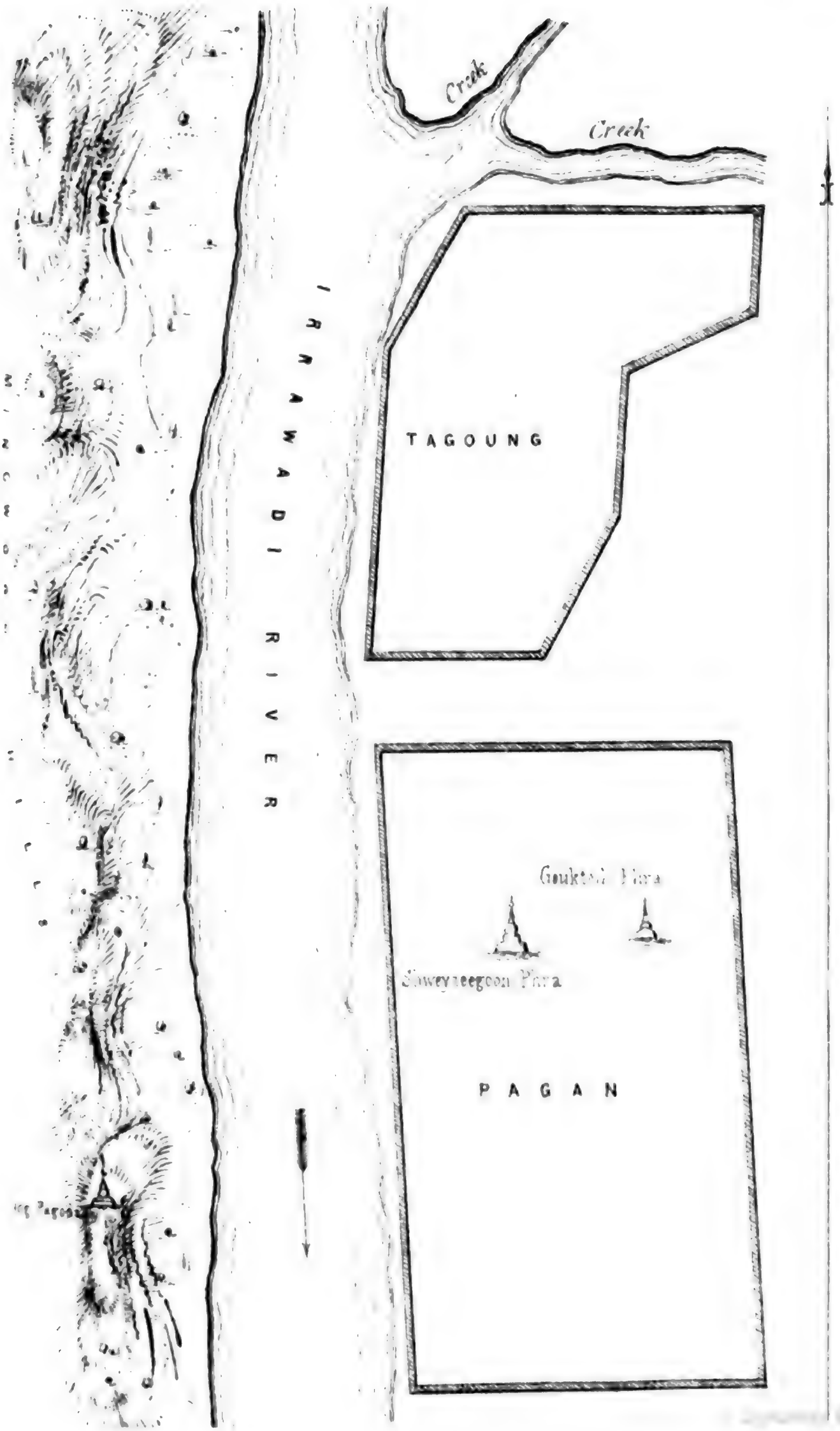
Creek
Creek
TAGOUNG
IRRAWADDI RIVER
Gouktok Pya
Sowyaegoon Pya
PAGAN

a point of some interest with reference to the evidence of former land surfaces which the section has disclosed.

Sealdah, Calcutta.

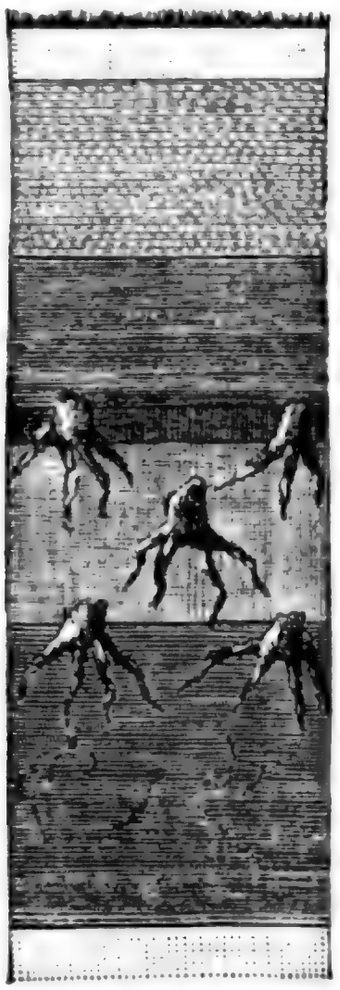

Fig. 1.

The section is illustrated in the accompanying wood cut, Fig. 1. The upper 3 feet (more or less) consists of vegetable mould and made earth, and rests on the irregular surface of bed *a*, the upper part of which consists of fine loam, much like the soil of paddy fields, but variable in different parts of the excavation. Thus in some places it consists of fine sandy silt, minutely laminated, and crumbling under the slightest pressure: elsewhere it is more argillaceous, and in general it is very full of fragmentary vegetable remains, too imperfect however to be recognised specifically. This bed becomes more argillaceous towards the lower part and near the base is a tolerably tenacious clay. Its total thickness averages 17 feet, the bottom being at 20 feet below the actual surface.

Bed *b*, is 1 foot in thickness, and consists of an impure peat, too earthy to burn, when dry. In it several stumps of Sundri trees are standing, the roots penetrating the bed immediately below. This bed is continuous all round the tank, and appears to extend every-

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where beneath Calcutta, and also on the Howrah side of the river,* although its depth is not everywhere uniform. Thus it is exposed in the bed of the river below Garden Reach, (at very low tides,) and also in the river bank at the Botanic Gardens. At these places its absolute depth is about 6 feet less than at Sealdah. In three borings in Fort William, on the other hand, it was met with at a depth of 51 feet, which, allowing for a difference of 3 feet between the actual surface levels of the Fort and Sealdah, would indicate a level 28 feet lower than that at Sealdah, and not less than 34 feet lower than at the Botanic Gardens. The correspondence of this part of the two sections is however such, that notwithstanding this great difference in level I cannot but think that the bed is either continuous or approximately so.

The peat bed rests upon a thick deposit of clay, *c*, sandy in the upper part, but passing downwards into a stiff blue clunch, which contains the stools of Sundri trees in situ at various levels, at least as far down as 30 feet from the surface, or 10 feet below the peat. Two very perfect specimens of these projected from the bottom of the tank at the time of my visit. Their roots penetrated the clay beneath, and I saw in the sides of a little well which had been sunk 4 feet lower, that the clay beneath was pierced in every direction by the roots of similar trees. These trees must therefore have grown at a level actually 15½ feet below the lowest water level of the canal, and 13 feet below that of the Hoogly.

No deeper excavation was open at the time of my visit, but I was informed by Mr. Leonard, that a deeper well sunk in the bed of the tank and subsequently filled up, had shewn that the clay bed extended to a depth of 15 feet below the tank bottom, and rested on a stratum of very loose black sand, fetid from the amount of vegetable matter which it contained. According to this, the total thickness of the bed is 25 feet below the peat, which corresponds very closely to that of the fort section, where the peat bed rests upon blue clay with *wood* and kunkur, and yellow clay, of a total thickness of 21 to 24 feet; and this on a stratum of wet reddish sand.

The point of chief interest in the Sealdah section is the occurrence of tree stumps in situ at the depth of 30 feet, and the evidence

* I am informed by Dr. Anderson, that the natives have a tradition to the effect that the Hooghly formerly passed from Cossipore some miles to the West of Howrah, its present course being that of an old native canal, into which the river burst its way about 150 years since, deserting its old channel. Thus the beds on the two banks of the actual river were formerly continuous.

afforded thereby of a general depression of the delta.* The trees in question, specimens of which I submitted to Dr. Anderson, were pronounced by him to be Sundri, a species, the range of which, as regards level, is restricted to from 2 to about 10 feet below high water mark. It grows only on mud, or where the surface is too frequently flooded to allow of the growth of grass, but at the same time it requires that its roots be exposed to the air for at least several hours of each tide. It is evident therefore that the trees at Sealdah could not have grown at the level at which they are now found, but that unless low water level in the Hoogly be 18 or 20 feet above that of the outer Soonderbuns, (where the Sundri now grows,) there must have been a depression of the land surface to a depth of several feet since they grew. I have not been able to obtain any data showing the relative low-water levels of the Hoogly and the outer Soonderbuns,† but Mr. Leonard informs me that there is but very little difference between the levels of the Hoogly and the Mutlah at Canning town, and this is not many miles above the actual geographical range of the Sundri, while the channel is so broad and deep as to forbid the assumption that there should be any material elevation of the low tide level of the former.

I think therefore we may safely infer, remembering the range of the Sundri, and that it never grows to within 6 or 8 feet of the lowest tide levels, that there must have been a depression of land to not less than 18 or 20 feet, since the trees grew, the stumps of which are now found at the bottom of the Sealdah tank.

If at the Fort, the wood found above and below the peat bed be, in situ, as I think most probable, there must have been a depression at this spot to a depth of not less than 46 to 48 feet; but whether the two land surfaces thus indicated were contemporaneous, and the relative depression, consequently, unequal to the extent indicated by these figures, the evidence before us, is I think, insufficient to establish.

* Or rather, additional evidence, for several proofs of subsidence were afforded by the section of the Fort boring.

† Since the above paper was read before the Society, I have obtained from Col. Gastrell and subsequently from Major Walker's Report of the operations of the G. T. Survey the accurate height of the sea level at Kidjiri with reference to Calcutta.

The mean height of sea level above the Calcutta datum line of Kydd's dock sill is 9,053 feet: the mean height of neap low tide levels above the same datum line, 5,51 feet. The height of the ground surface at Sealdah above the datum line is 22 feet, and therefore 16,49 feet above low tide level at Kidjiri.

Hence the tree stems at the bottom of the Sealdah tank are (30—16,49)= 13,51 feet below the mean level of neap low tides.

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Kulnah, Jessore.

Fig. 2.

The depression was I think very extensive, if unequal; thus I am informed by Mr. Leonard that the peat bed occurs at a depth of 20 feet at Canning town on the Mutlah, the actual land level of which place is certainly several feet below that of Sealdah, and a section of a tank near Khulnah in Jessore, for which I am indebted to the kindness of Col. Gastrell, shews a peat bed at a depth of 16 ft. 6 ins. to 20 feet, and trunks of trees with roots attached at various levels from 18 to 24 feet. This very interesting section is shewn in the accompanying wood cut, Fig. 2.

From these facts, I infer an average depression of the Gangetic delta of 18 or 20 feet since the land surface existed, which is marked by the Sundri trees in situ. It is noteworthy that the trees, in all the sections I am acquainted with, are restricted to a vertical thickness of from 8 to 10 feet, and that the strata above, though frequently full of fragmentary plant remains and sometimes fresh water shells, shew no indications of former land surfaces. This indicates not only the uniformity of the depression, but also that it was everywhere more rapid than would be compensated for by the deposition of sediment.

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Memorandum on the life-sized Statues lately exhumed inside the Palace of Delhi.—By C. CAMPBELL, *Esq., C. E.*

Delhi, June 5th, 1863.

1. We have now collected together and sorted all the fragments, and find that they comprise, apparently, portions of no less than 3 groups, all imperfect, as follows.

Elephants	Feet,	11	fragments.
„	Legs,	18	Ditto.
„	Trunk,	21	Ditto.
„	Head,	4	Ditto.
„	Body and Howdah,	63	Ditto.
„			

And in addition several hundred fragments that cannot now be identified.

Of human figures, there are 3 portions of a body, 4 fragments of arms, and one complete head.

These are in a very rude style of art; one of the hands is comparatively perfect and has the thumb on the exterior, *i. e.* where the little finger ought to be, and vice versâ. An attempt has been made at some former period to repair these groups; this is evident from many of the fractures having been cut square, and new pieces of stone fitted in, whilst from the fact of these new pieces having remained uncarved, it is clear that the attempt was soon abandoned.

2. There can be no doubt that these are the identical figures seen and described by Bernier, who visited Delhi at the commencement of of Aurungzebe's reign. His description is as follows.

"The entrance of the fortress (palace) presents nothing remarkable besides two large elephants of stone, placed at either side of one of the principal gates: on one of the elephants is seated the statue of Jemel, the renowned Rajah of Chittore; on the other is the statue of Polta his brother. These are the brave heroes, who, with their still braver mother, immortalized their names by the extraordinary resistance which they opposed to the celebrated Akbar; who defended the towers besieged by that great Emperor with unshaken resolution; and who, at length reduced to extremity, devoted themselves to their country, and chose rather to perish with their mother in sallies

against the enemy, than submit to an insolent invader. It is owing to this extraordinary devotion on their part, that their enemies have thought them deserving of the statues here erected to their memory. These two large elephants, mounted by the two heroes, have an air of grandeur, and inspire me with an awe and respect which I cannot describe."

Of their removal from this position nothing is known; from the state of the remains it was evidently attended with violence, and is probably therefore due to the iconoclastic tendencies shewn by Aurungzebe, in the latter part of his life. The attempt at restoration would be made during the reign of one of his successors, when it may have been proposed to complete the group, by the addition of a third elephant, bearing the effigy of the heroic mother of the two Hindoo princes.

On the abandonment of the design, the fragments would be left to lie neglected and uncared for; many would be stolen or employed in the decoration of new buildings, until what was left was buried in the ruins of the house where they lay, and from the debris of which they have just been recovered.

3. The question now arises; are the statues lately exhumed the same as those described by General Cunningham as existing at Gwalior? That they are independent works by Mahommadan artists is very unlikely, although it is of course *possible* that they may have been made by order of the Emperor Shah Jehan when the new city and palace were designed by him; but why, in this case, should the effigies of princes of a hostile race and faith have been selected as subjects? and how account for the absence of any mention of them in the records that have descended to us? It is much more probable that they were the work of Hindoo artists, brought from a conquered city for the adornment of the new palace of Shah Jehan; if so, did they come from Chittore? I think not, for, had they existed there for any time, they must have been as well known as the Gwalior ones, which does not seem to have been the case.

4. It must be borne in mind that they are not *statuary portraits* like those executed by European artists, but mere effigies like "Gog and Magog" in the London Guildhall, and they probably bore as much resemblance to Jemel and Polta as to Maun Sing, or any other Hindoo chief.—Bernier's statement is no proof of their being actually

meant as likenesses of the two brothers, and merely shows that at the time of his visit, they were popularly known by general repute as representing the two Chittore princes, but leaves untouched the assumption that they may have been in existence for centuries, may have been known at Gwalior as memorials of the popular hero there, —Raja Maun Sing—and on their removal to Delhi, may have been re-named by Shah Jehan, in memory of some incident in his early youth, connected with the fall of Chittore.

5. In his memorandum, General Cunningham has shewn that the art of sculpture had long flourished at Gwalior, and that more than one statue of a life-size existed there. Of the most famous of these, he has traced the history down to the reign of Shah Jehan, and proves that it had disappeared from Gwalior in the next reign. Its disappearance he connects with the iconoclasm of Aurungzebe, but if that Emperor destroyed it at *Gwalior*, how came the fragments to find their way to *Delhi?* Their removal must have occurred during the troubled reigns of the successors of Aurungzebe, who had but little leisure or inclination for adorning their capital with expensive restorations of ruined statues, brought from so great a distance.

6. The history of the Gwalior statues then, ends abruptly in the latter part of Shah Jehan's reign; that of the Delhi ones commences as abruptly about the same time: what is more probable than that the two groups are identical, and that they were removed from Gwalior by Shah Jehan, who would gladly avail himself of this opportunity of transferring to his new palace and capital, works of art so celebrated? the only ones of their kind, apparently, that existed in his dominions, and the removal of which, in their uninjured state, would be a comparatively easy task; how the change of nomenclature may have arisen, I have already pointed out.

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Memoranda relative to three Andamanese in the charge of Major Tickell, when Deputy Commissioner of Amherst, Tenasserim, in 1861.—*By Col.* S. R. Tickell.

In May, 1861, three Andamanese, who had been captured near Port Blair some time previously, and sent over to Rangoon by the Superintendent, Colonel (then Major) Haughton, for educational purposes, were placed in my charge by Colonel Phayre, at that time Commissioner of Pegu.

Hitherto they had been attended to by one of the men of the Naval Brigade at Port Blair, to whom they seemed much attached; but they were parted from their keeper at Rangoon, and sent over to Maulmein under the care of one of the Officers of the Steamer, who forwarded them to me on their arrival.

They were dressed, when I first saw them, in light sailor's costume, slops and jumpers of white duck, and straw hats, bound with broad black ribbon, bearing the ship's name to which their former guardian had belonged. They could not speak a single word intelligible to a by-stander, and looked so frightened and miserable amongst new faces, that after many attempts at coaxing and cheering them up, I considered the best plan to take them back to the steamer, and re-ship them for Rangoon. One of the small hack palankeen carriages that ply in Maulmein was therefore procured, into which they got with alacrity, fancying I suppose they were to be immediately driven to Port Blair, and off they started for the steamer But I had hardly re-entered the house and commenced a letter to Colonel Phayre about them, when back they came, walking hand-in-hand with a Burman, amid a crowd of people, and appearing as excited and joyful as they were before dejected. On enquiring the reason of their return, I was told that as the carriage was proceeding up the road, they had espied a Burman whom they had known at Port Blair, and overjoyed at the sight of a familiar face, one of them had opened the door, and before the vehicle could be stopped, got out, (thereby receiving a rough fall on the ground,) and embraced his old friend, whom they all three accompanied back to my house, in great glee, laughing, patting him on the breast, and putting their arms round his neck. That same evening I engaged his services to take the immediate charge of the

Andamanese, and for the rest of their stay at Maulmein, they lived under his roof. The arrangement was particularly convenient, as the Burman "Moung Shway Hman" speaks English, which it was proposed to teach the Andamanese, and is a man of steady habits and good character.

The photograph which accompanied Colonel Fytche's paper in the J. A. S. No III. 1862 will give a better idea of the physiognomy of these people than the most laboured description. Mr. Blyth, Curator of the Asiatic Society's Museum, and a remarkably accurate observer, was at Maulmein for some time with these Andamanese, and pointed out the leading peculiarities of their configuration, and as his remarks have been embodied in the report, which Colonel Fytche, Commissioner of Tenasserim, sent to the Journal of the Asiatic Society, it would be superfluous to dwell on this part of the subject; but I would take this opportunity of observing that I cannot agree with an opinion which has been more than once published, that the Andamanese have no affinity to the African race. They appear to me on the contrary, to be very closely allied. The small ear and the less gross lips are not, in my opinion, sufficient data on which to found a fifth, to the long established four grand divisions of mankind. From the few remarks to be gathered on the subject, in Bowring's account of the Philippines, it seems probable that the people of the interior, called Nigrettoes, who have so long withstood all attempts at civilization and communication with the Europeans and Eurasians of the coast, are the same race as the Andamanese. And further South, the ferocious savages of the interior of Sumatra, from whose hands Madame Pfieffer had so providential an escape, are also probably the same, but she has not given a sufficiently detailed description of them to allow of certainty on this point. How this so-called Papuan tribe came to be so separated from the strongly defined geographical limits of the African race, and spread throughout the Eastern Archipelago, will perhaps ever remain a matter of conjecture: but their distribution throughout that space, from the Andamans to Sumatra, (if not further,) may be accounted for by the propinquity of those islands to each other.

Our three friends were named at Port Blair, Crusoe, Jumbo, and Friday, and labelled accordingly; each name being stamped on a tin medal worn round its owner's neck. The necessity for such an apparently whimsical arrangement may be understood, when it is

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explained that this singular people have ' (as far as close observation allowed us to observe)' *no proper names* for each other, and readily learnt to adopt those by which they were ticketed.

On their arrival at Maulmein all three had bad coughs, and Crusoe and Jumbo evident phthisical symptoms. Crusoe's health improved after some time: but Jumbo gradually grew worse, and his malady was greatly increased from exposure during inclement weather, in an attempt to escape, which he and his companions made one stormy night. They made their way in a native canoe towards the mouth of the Maulmein river: but were glad, in three or four days, to return under the guidance of the village police to Maulmein. Jumbo never rallied from the effects of this excursion, and in spite of all that medical assistance could do, died in the jail hospital on the 12th June, nearly one month after his arrival. His comrades repaired to the hospital and showed signs of genuine grief at his death. They also performed some singular ceremonies over the body, which I wished to have witnessed repeated the next morning: but owing to some rather precipitate measures, taken without the slightest reference to myself, to prepare a skeleton of the deceased for presentation to the Asiatic Society's Museum, I was unable to do so.

Of the three, Crusoe, the oldest, (apparently about 35 years of age,) was the only one who showed any moroseness of disposition. Jumbo was of a cheerful gentle nature, and Friday the youngest, whose age might be 18 to 20, was at times very lively, good tempered, and fond of his immediate overseer Shway Hman, and of myself. They came frequently to my house, and were allowed free access to every part of Maulmein. Their curiosity at every new object was great, but evanescent. They soon tired of everything, and when left alone, relapsed into dejection, making unintelligible speeches with lamentable signs, evidently about a return to their own country.

Some time after Jumbo's death, Crusoe showed consumptive symptoms, to a degree which made me despair of ever getting him alive back amongst his countrymen: but he fortunately rallied during the heavy rains, and left Maulmein for Port Blair comparatively well. Friday, after getting over a cough that at first troubled him, continued in robust health to the time of his departure. It is an extraordinary fact that savages, accustomed from birth to go naked, or nearly so, contract pulmonary diseases if forced to wear clothing. This has

been remarked amongst the aborigines of Australia and the South Sea islands. Crusoe's height is 5′ 1¼″ That of Friday 4′ 9½″ The former is of rather a spare frame, which may be partly attributed to pneumonia. Friday is square, muscular, and deep chested. Both have small hands and feet; which, with their foreheads, are cicatrised all over with scratches inflicted on themselves as a cure for all manner of pains and aches; and the feet of both had a constant adematous appearance, with small feeble toes wide apart, as if they were never much used to pedestrian exercise. Both of them occasionally complained of headache, and would then smell with avidity at salts, stuff their nostrils with leaves freshly plucked, or as a last resource, score their foreheads with a knife or a piece of broken glass, till they bled pretty freely. They were much averse to taking our medicines, and Crusoe on one occasion threatened his Burman keeper with a knife, for trying to administer some nauseous dose. Neither of them would take to learning English. They repeated like parrots the words we endeavoured to make them understand, and at last grew so averse to their schooling, that at any attempt to commence it, they would feign fatigue or sickness as readily as any truant schoolboy. They were in fact *too old* to learn, and although Friday was smart and intelligent, he showed it more by his extraordinary powers of mimicry than by learning anything useful. This persistence in imitating every gesture and every sound of the voice, made it particularly difficult to obtain from him the Andamanese name of even any visible object. Those entered in the annexed vocabulary, have been elicited with no small labour and patience, by myself and their keeper Shway Hman. I succeeded in obtaining the names of a variety of fishes, (common to the bay of Bengal,) by showing coloured drawings of them: but of quadrupeds they appeared perfectly ignorant, the only mammal they seemed to know was a pig, "Rogo," and this name they applied indifferently to cattle, ponies, elephants, deer, and monkeys. They appeared also to have very few names for birds, and when shewn the pictures of some which I knew to be found in the Andamans, merely attempted to imitate the notes of any species they might have had in their minds at the time.

To judge by Crusoe and Friday, the Andamanese are not a timid race. They mingled unconcernedly amongst crowds of people, and at first used to help themselves to any thing they took a fancy to, off

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the stalls in the bazar. When teazed with the numbers looking at them, Crusoe would stride towards the throng, waving them off and calling out in Burmese "â-loong thwa" (go! all!) They took great pleasure in the pways or Burmese dances, and learnt to imitate the performances with marvellous exactness, to the great delight of the Burmese, who crowded to see them. Sometimes they exhibited their own national dance, which appears to consist solely in lifting their clenched fists above the head, and kicking the ground rapidly and forcibly with their heels. It has a peculiarly savage effect; but having apparently excited great mirth amongst the spectators, Crusoe and Friday took offence at such notice, and latterly never repeated their exhibitions. With the little hack carriages which ply in Maulmein they soon became familiar, and were treated to rides almost every day: and they would walk up to a pony, and hug it, though once or twice narrowly escaping a bite. When first taken to see some steam saw-mills where elephants were employed stacking timber, they showed no alarm at the huge animals, although the first they had ever seen, and Friday was about to walk up to and pat a large tusker, when the bystanders restrained him. Of fire arms or of anything explosive however, they seem to have some dread. Latterly they learnt very well the use of money, and any cash in their possession was usually spent in the purchase of pork or other meat at the Chinamen's shops. Fruit (except plantains) or sweets, they cared little for; but were very fond of tea prepared in the English way. Fish they were indifferent to, also to rice: but they ate a great deal of meat and yams, making three hearty meals a day. I generally gave them a fowl when they visited me, and for which they took care to ask by calling out "kookroo koo" and imitating the cries of poultry. They killed the fowl by pressing the chest and neck, and swinging it round and round. They would then pluck, clean, and boil it, their usual mode of cooking anything. Occasionally they broiled meat on the fire: but never eat animal substance raw. But they never set about cooking for themselves if they could induce their keeper's wife "Ma Shway" to save them the trouble. At my house they were often allowed to sit at the breakfast table, where they behaved with decorum, but quite at their ease: lolling back in their chairs, and pointing towards anything they wanted. They learnt to use a spoon, knife, and fork readily.

In their visits to me I used to remark that Crusoe on first arriving would shout out something in his loud harsh voice. It occurred so often, that I am induced to think the act analogous to a custom in some parts of Ireland amongst the peasantry, where a man on entering a cottage calls out "Good luck to all here"—I have never been able to ascertain what it was that Crusoe said on these occasions.

As I before remarked, these people appeared to have no proper names. When one called the other, it was with a shout of "Hy" much as is used in hailing a cabstand. But occasionally they named each other Crusoe and Friday, and invariably spoke of their country as Blair. They learnt my name, but usually addressed me as "Má-ey, (Oh man) ; nevertheless it is difficult to conceive how any community can carry on intercourse without the aid of proper names both to persons and places, and I am not aware that such a strange deficiency has been observed in the language of any other tribe, however savage.

Although most pertinacious beggars, and glad to take anything offered them, their cupidity was chiefly shown for iron, of which they took with them from Maulmein, a large quantity in the shape of knives, forks, dás, or Burmese choppers, nails, scissors, hammers, and needles. They frequently sat for hours watching the blacksmiths at work, and also learnt to ply the needle with some skill and to use scissors. As they acquired a strong liking for clothing, it is possible they will not willingly return to their old habits of nudity, and so will find their sartorial accomplishments of advantage. Although I procured them a quantity of the coarse kind of tackle used for sea-angling, they took no interest in its use ; which is the more singular, as in their native state they are most expert fishermen, especially in spearing fish.

Friday procured a bow and some arrows, with which I met him one day armed, marching up the street at the head of a posse of idle boys : but I never had an opportunity of witnessing his skill in archery. He had seen guns fired but never attempted using one himself. They were both expert swimmers, their mode of progression being with the arms and legs alternately, the former under water : not striking out like an Englishman, nor throwing one arm out after another like the generality of continental Europeans. They could manage a Burmese canoe with ease : but never occupied themselves with paddling about for amusement. They evinced great pleasure in making short trips into the interior with their conductor, visiting

the numerous orchards and villages in the vicinity of Maulmein. And as the arrival of the mail steamer invariably renewed their hankering after their own country, I used latterly to send them away during the stay of the vessel in the port, and having found out their name for the moon "Chookleyro" I was able generally to soothe them when much dejected, by repeating the word, and "Blair kadó" (go to Blair), and holding up as many fingers as I supposed might mark the number of months they were likely to stay.

They were fond of tobacco, and of such snuff as was procurable in the bazar, but owing to the state of Crusoe's lungs, smoking was not allowed to him latterly. They seemed to take pleasure in having the scanty frizzly wool of their heads shaved off, an operation which was several times performed on them. They were very docile in learning habits of cleanliness: bathing every day, using soap, and getting their clothes washed, cleaning their plates after meals, sweeping the floor, &c. To "Ngapee," a strong smelling condiment made of dried and powdered fish, in universal use amongst the Burmans, they could never be reconciled. Besides the phlebotomising operation already described, they used, when in pain, and also when feeling chilly, to apply heated stones to the afflicted part; and on such occasions would huddle together close to the fire. They showed great pleasure at the sight of English children, and would kiss and fondle them if the little folks permitted it. To Burmese children also they evinced great partiality, and frequently caressed Shway Hman's daughter, a child of 5 years of age. Their grief at the death of their comrade Jumbo, was great, but not lasting.

When the time came for these poor creatures to return to their own country, and it was explained to them they were to go, which was chiefly done by patting them on the back with a smiling countenance, and repeating the words "Blair ka-do," without the ominous fingers indicating the moons yet intervening, their delight is not to be described. For the two nights previous to their departure for Amherst, where they were to embark on board the "Tubal Cain," they lay awake and singing, and had all their property carefully packed and put under their pillows. But at the moment of departure, they showed unwillingness to leave Shway Hman's wife behind, and when on board the ship, were disconsolate at their Burman friend himself not accompanying them. Fortunately they met there Lieut. Hellard I. N.,

whom they knew, and also a sailor of the Naval brigade at Port Blair, who had formerly charge of them, and to whom they were much attached, and under the care of these kind friends they reached their native country safely, and were, with all their traps, put on shore at a spot on the beach they pointed out, and quickly vanished into the jungle!

From that time to the present, I have heard no more of my quondam protegés: I cannot indeed distinctly ascertain whether either of them ever made his appearance again at Port Blair. An apprehension existed for a long time, that they had been murdered by their countrymen for the sake of the precious iron articles they had with them, and I know not whether such a conjecture has been refuted.

The experiment of civilizing these two, by weaning them from their wild habits and creating artificial wants, to supply which should involve the necessity of frequent visits to the settlement, and thus form as it were the nucleus of increasing intercourse with a superior race, has certainly so far failed. With younger subjects we might have succeeded better, particularly in teaching them English: but probably so at the expense of their own language and of their own habits to such a degree, that as interpreters or channels of communication with the natives, they would have been as useless as Crusoe or Friday. It remains to be seen what effects will by and bye arise from the repeated interviews between the aborigines and our people. Unfortunately these are frequently of anything but an amicable nature, and tend rather to widen than to bridge over the gulph between them. Indeed if the inference be correct, that the inhabitants are of the same race as the Nigrettoes of the Philippines, who to this day keep entirely aloof from the settlers on the coast, we may surmise that the colonisation of the Andaman islands, when its spread begins to interfere with the aborigines, will tend rather to the extermination of the latter, than to any amelioration in their condition. It is to be regretted that since the days of Colonel Haughton, very little information is published regarding our relations with this truly savage people.

Rangoon, July 28th, 1863.

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Vocabulary of Andamanese words, as ascertained from CRUSOE *and* FRIDAY.

NOUNS.

Fish,	Do.
Man,	Má.
Woman,	Chana.
Water, Rain,	Pano.
Moon,	Chookleyro.
Yam,	Chatee.
Plantains,	Eng-ngeyra.
Rope,	Allák (Bengali ?) alát.
Cocoanut,	Jayda.
Rice (unboiled,)	Anakit.
A stick,	Erreybat.
Spit,	Moochee.
A pot,	Tók.
String,	Garrik.
Cock (poultry,)	Kookroo (Beng.)
Plate or dish,	Wyda.
Hat, cover,	Seytey tók.
A carriage,	Raik (?)
Knife, Sword,	Koona.
Pig, pork,	Rogo.
Noon or Sun?	Aleyburdra.
A Sore,	Angoonchoon.
Fire,	Chaukay.
Fire-wood,	Chapa.
Meat, Flesh,	Rekdama.
Bread,	Ochata.
Boiled rice,	Chata.
A cheroot,	Dákanapo.
A snake,	Wangada.
A Bow,	Karama.
Broken bits of glass,	Beramato.

Needles, Arrow-head? Bits of iron, Tólbót.

Smoke,	Moralitorkay.
Maize,	Oodala.
A Rat,	Itnachamma.
Bones,	Tato.
Sugar Cane,	Teeree.
Sweet things,	Jóng.
Little girl,	Chanjibal.
Little boy,	Májibal.
Flower,	Cheyda.
Ship,	Cheyley.
A spider,	Nyonada.
A musquito,	Tayla.
Tongue,	Kytala.
A tooth,	Tokadoobda.
A knee,	Lo.
Blood,	Pay.
Hair,	Eppee.
A foot,	Onkono.
A nose,	Icharónga.
A ear,	Pogo.
A eye,	Edala.
A hand,	Gogo.
Bits of cloth,	Rollo.
A gun,	Beerma (?)
A star,	Chittooree.
A stone,	Tylee.
Wax,	Pyda.
The head,	Pyleeda.
To-morrow,	Garra ?

Adjectives or Participles.

Cold (as meat,)	Mauriwada.
Chipped	Lokkamen.
Lost or concealed ?	Kytalaya ?
Cold (as weather,)	Tatay.
Spilt,	Kaupilay.
Unripe,	Potowyk.
Hot,	Deggaralak.

Itching,	Dowkodoblak.
Good,	Ooba.
Bad,	Ookaooba.
Tired,	Odoola.
Dead,	Awalay.

Verbs.

To sit,	Deedo.
To sleep,	Mamee.
To take,	Nya.
To go,	Kadó.
To come,	Kameeka.
To bring,	Taw.
To walk,	Dikleer.
To dance,	Tykpa.
To throw away,	Apay.
To vomit,	Dadway.
To bathe,	Darcha.
To cut,	Kauppa.
To give,	Jay.
To broil, / To roast,	Pówet.

Adverbs.

Much,	Yâd.
No,	Yabadá.

Phrases.

Sit a little,	Tara deedo.
Much fish,	Yâd do.
Stomach full,	Tek bo.
Don't go,	Á kuddo.
Rain falls,	Pano lappa.
Put it down,	Gulla loongdakéy.
I will remain here,	Do palee.
Take it (from another,)	Nyey ree.
Let it be: Put it down,	Tota da.
I will not give,	Oochinda.
Let it alone,	Kookapa.

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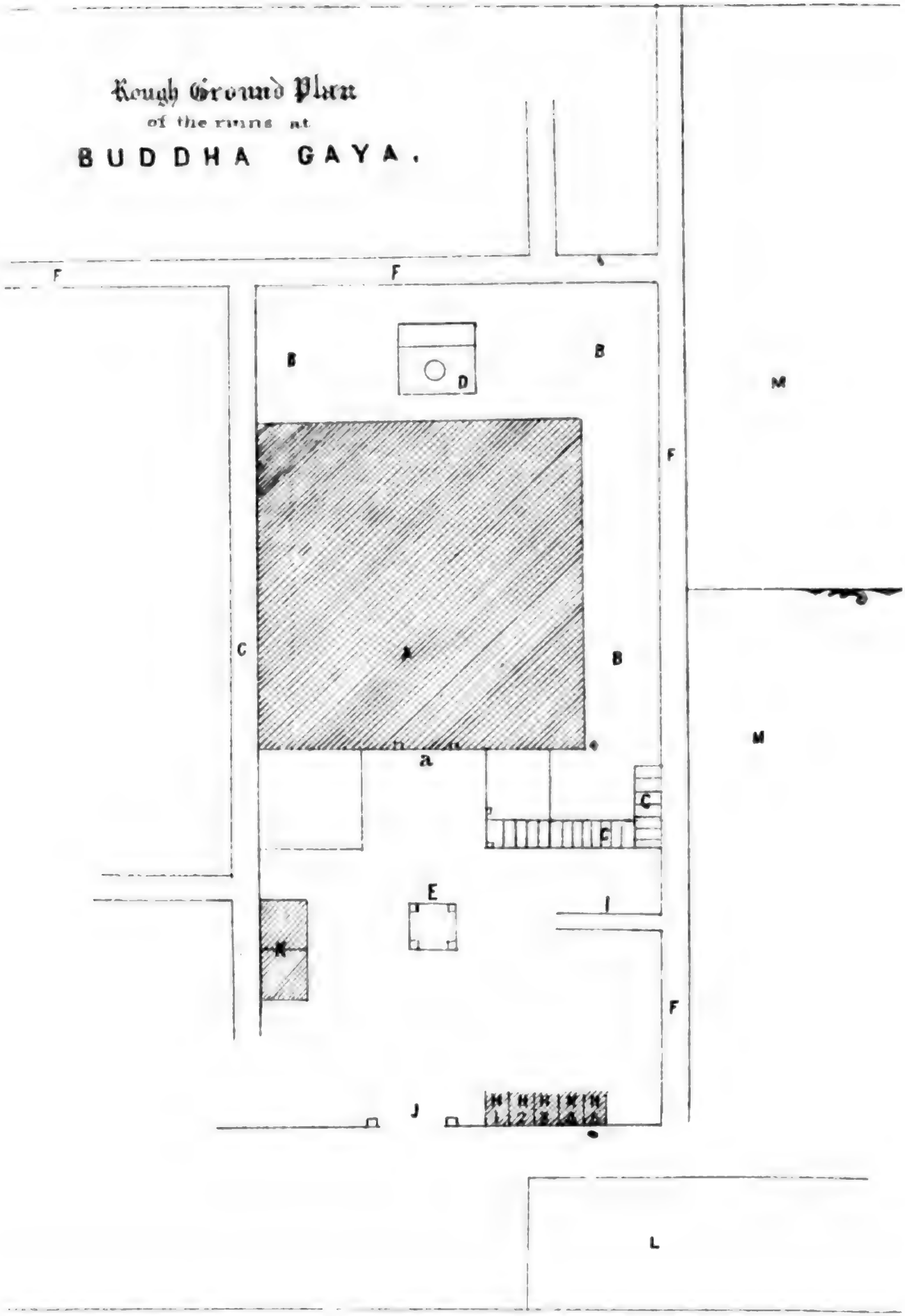
Rough Ground Plan
of the ruins at
BUDDHA GAYA.



REFERENCES.

A	Principal Temple
a	Doorway
B	Terrace
C	Stairs
D	Bodhi Tree
E	Buddha's seat
F	Trench shewing the plinth of the Temple
H 1 to 5	Temples N°3 has a large seated figure in
I	Stone tunnel
J	Arched gateway
K	Modern rooms
L	Modern [illegible]

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I will drink, ...	Oowel lee.
There is none,.....	Tappee.
I want to sleep a little, ...	Tautaro mameekay.
Stomach aches, ...	Udda mookdoo.
I don't wish to stay, ...	Oopadopalee.
Boats are racing or rowing,...	Arra choro.
I have some, / There is some, }	Gada.
It is lost, or I can't find it.	Ky'ta laya.

Note.—Some of these phrases are only inferentially derived, that is from their constant recurrence under like circumstances. When Crusoe or Friday were hunting about for anything and could not find it, they used to say in a vexed tone " Kyta laya." If offered anything, they would when refusing it in an *affirmative* manner, say " Gada" as if they had it already, and so on. It is very possible then that many of these phrases are not literally rendered.—S. R. T.

On the Ruins of Buddha Gayá.—By Bábu RÁJENDRALÁLA MITRA.

Having had lately an opportunity of devoting a short time to the examination of the Buddhist remains at Buddha Gayá, I believe a brief account of the excavations now being carried on at that place will not be unacceptable to the Society. Accordingly I do myself the pleasure of submitting to the meeting this note along with a drawing (done from memory) of the ground plan of the ruins, as also a sketch of the railing round the great temple at that place. They have been worked out from notes taken while on my travels, and may be relied upon as generally correct. I had no instrument with me for taking accurate measurements, and as Capt. Mead, the able officer who is now superintending the excavations, will, ere long, submit to Government a detailed report of his proceedings and discoveries illustrated by carefully prepared drawings, and as my object was simply to see what was in progress, I did not think it necessary or proper to take any measurement or anticipate the work of that gentleman.

Buddha Gayá is one of the most celebrated places in the annals of Buddhism. There it was that S'ákya devoted six long years in deep meditation to purify his mind from the dross of carnality, by abstaining altogether from food, and subjecting his body to the most unheard-

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of hardships; there he repeatedly overcame the genius of sensuality—*Mára*, who assailed him with his invincible host of pleasures and enjoyments to lead him astray from his great resolve; and at that place he attained to that perfection which enabled him to assume the rank of a Buddha, the teacher of man and gods and dispenser of salvation. The exact spot where these protracted meditations and austerities were carried on, is said to have been the foot of a pipul tree, and hence that spot is held in the highest veneration by the followers of the Saugata reformer. It was believed to be the holiest place on earth; temples and monasteries were erected round it even during the life time of S'ákya, and as long as Buddhism flourished in India, it was the resort of innumerable hosts of pilgrims from all parts of the Buddhist world. With the downfall of Buddhism the place lost its grandeur, and at the end of the tenth century was, according to an inscription published in the *Asiatic Researches*, (Vol. I. p. 284) by Wilkins, "a wild and dreadful forest," "flourishing with trees of sweet scented flowers," and abounding in "fruits and roots," but "infested with lions and tigers, and destitute of human society." A magnificent temple, however, still stands, and around it vestiges abound to attest to its former greatness. General Cunningham has even recognised the identical flag of stone upon which on one occasion Buddha, while a roving mendicant, sat and ate some rice presented to him by two maidens.

The tree, however, under which Buddha sat, and which was the greatest object of veneration, has long since disappeared, and its place is now occupied by one which, though decayed and dying, is scarce two hundred years old. It stands on a masonry basement of two steps about six feet high, and built on a large terrace of concrete and stucco. Its immediate predecessor probably stood on a level with the first step which seems to have been raised long before the second. The third predecessor, according to this idea, was on a level with the terrace, and as that terrace stands about five and twenty feet above the level of the surrounding country, and as Capt. Mead, in course of his excavations, has found traces of two terraces, one very distinct, at intermediate depths, it is to be presumed that several trees must have from time to time occupied the spot where stood the original *Boddhidruma*, or "Tree of Knowledge," under which Buddha attained to perfection. It is no doubt possible that as earth and rubbish accumulated round

the original tree, people from time to time built raised terraces and covered up its roots, so that the tree in a manner rose with the rise of the ground-level, and that every new terrace or step was not necessarily an evidence in favour of a new tree; but the fact of the tree that now exists being a modern one, warrants the presumption of its having had several predecessors at different times. Moreover, as the plan of renewing the tree was evidently not by cutting down the old and planting a new one in its place, but by dropping a seedling in the axilla or a decayed spot of the old tree, so as to lead to the supposition that it was only a new shoot of the parent stem and not a stranger brought from a distance, it was found necessary to cover up the root of the new comer under guise of putting fresh mould on the root of the old one, to prevent the imposition being discovered. Hence it is that the present terrace is much higher than the tops of the surrounding heaps of rubbish.

Close by the tree, on the north side, is placed the Burmese inscription noticed by Col. Burney in the last volume of the *Asiatic Researches*. And immediately to the east of it stands the great temple of the place, a monument rising to the height of 160 feet from the level of the plain. Its pinnacle is broken; when entire it must have added at least twenty feet to the altitude of this cyclopæan structure. General Cunningham, in his Archæological Survey Report for 1861-62,* has given a full description of this edifice; but there is one point of importance in it which escaped his notice, and to it, therefore, I wish to draw particular attention: I allude to the existence of three complete arches on the eastern face of the building. The doorway is wide but low, and is formed of granite side-posts with a hyperthyrion of the same material. That was, however, supposed to be unequal to the weight of the great mass of masonry rising to the height of near 150 feet, which rested on it, and three Saracenic or pointed arches were accordingly thrown across to remove the weight from the hyperthyrion to the side abutments. Two of these arches have fallen in, breaking exactly where an over-weighted arch would break, namely, at the points where the line of resistance cuts the intrados. The third is entire. It is pointed at the top, but is formed, exactly as an arch would be in the present day, of voussoirs or arch-stones placed wedgewise, the first and last of which are sustained on the abutments, while the intermediate

* Ante Vol. XXXII. p. vii.

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ones are held together in their position by their mutual pressure, by the adhesion of the cement interposed between their surfaces; and by the resistance of the keystone. Such a structure in an Indian building more than two thousand years old, struck me as a remarkable proof of the Hindus having had a knowledge of the principle of the arch at a very early period, though the credit of it has been denied them by all our Anglo-Indian antiquaries. Fergusson, in his Hand Book of Architecture, concedes to the Jains a knowledge of the horizontal or projecting arch, but adverting to the radiating or true arch, says, (Vol. I. p. 78) "In the first place no tope shows internally the smallest trace of a chamber so constructed (*i. e.* with a true dome)—nor do any of the adjacent buildings incline to such a mode of construction which must have ere now been detected had it ever existed." Elsewhere he observes (p. 254) "The Indian architects have fallen into the other extreme, refusing to use the arch under any circumstances, and preferring the smallest dimensions and the most crowded interiors, rather than adopt what they considered so destructive an expedient." Adverting to the Kotub, he says, "all the openings possess pointed arches which the Hindus never used" p. 418). Again, "the Hindus however up to this time (*i. e.* of the Pathans) had never built arches, nor indeed did they for centuries afterwards" (p. 424). These remarks do not, it is true, directly mean that the Indians had no knowledge of the arch, but they imply it. Elphinstone is more positive. In his remarks on Hindu bridges, he says, "Nor does it appear that the early Hindús knew the arch, or could construct vaults or domes, otherwise than by layers of stone, projecting beyond those beneath, as in the Treasury of Atreus in Mycenæ." (Hist. of India, p. 163.) Depending on the testimony of these distinguished antiquarians one may very reasonably assign to the Buddha Gayá temple a much later age than it claims, but the fact of its having been visited by Fa Hian and subsequently by Hiouen Thsang long before the advent of the Mahomedans in this country, inevitably leads to the inference of its having existed at a pre-mahomedan era, while the position the arches occupy, is so natural and integral that it leaves no room for the hypothesis that they were subsequent additions. I brought the fact to the notice of Capt. Mead, who had kindly undertaken to shew the ruins to me, and he readily acknowledged that the builders of the temple, whoever

they were, certainly knew the art of constructing an arch, and the one before us was a very good specimen of it. The entrance gate to the courtyard of the temple has a similar arch over it, though there it has no superstructure to sustain, and seems to have been built more as an ornament than otherwise. It may not be amiss here to observe that by the selection of the pointed, instead of the semicircular, arch, the builder has displayed a correct appreciation of the superiority of the former in regard to its weight-bearing capabilities.

In a line with the gate, and to its north, there formerly stood a range of small temples, which have since fallen in, and been entirely buried under rubbish. Capt. Mead has laid bare five of these, and in one of them I saw a colossal figure of Buddha seated on a lotus throne, with the hands resting one upon the other on the lap. This position is called the *Dhyána Mudrá* or the "meditative position," and it was thus that Sakya passed his years of mental abstraction under the great pipul tree. There is an inscription on the throne which records the dedication of the figure by one Boddhikhsana of the village of Dattagalla, the writer being Upavyáyapurva an inhabitant of Masavágra. The character of the writing is the Gupta of the 4th century. The letters have been carefully cut and well preserved.*

Beyond these temples Capt. Mead has excavated a trench from east to west, laying bare a line of stone railing which formerly enclosed the courtyard of the great temple, running close along the base of the terrace around the sacred tree. It was formed of square granite pillars,

* The inscription comprises three slokas in the fascile octosyllabic anushṭup, and runs as follows.

दमनिन्नरयरचित्ता सर्व्वसत्त्वानुकम्पिने।
सर्व्वनन्नरमदार स्थितमारायपतये॥
प्रह्वात्माकारयामास बोधिमार्गरतोयतः॥
बोधिचणेति विख्यातो दत्तगञ्जनिवासिकः॥
सर्वबन्धविमुक्त्यर्थं पित्रोर्बन्धुजनस्यच
तथोपव्यायपूर्व्वेण मासवायनिवासिन॥ लि॥

Translation. "Salutation to (Buddha) whose mind is ever directed towards the control of his passions, and who is kind to all created objects, and this with a view to overcome the resources of Mára lodged in blissful gardens of unlimited expanse. (?)

Bodhikahana, the pure-hearted, of the village of Dattagalla having his mind devoted to the dispensation of Buddha, dedicated this (statue) for the removal of all kinds of bondage from his parents and relatives. Upavyayapúrva of the village of Masavágra wrote this." The author could not condense in the verse the word "wrote," so he has given it in initial after it. The third and fourth feet of the first verse are not intelligible.

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each having three medallions on the front and three mortises on each side for the tenons of as many cross bars. On the top was a coping stone rounded above, but flat beneath. The pillars were seated on a square base with mouldings on each side. The falling in of the monastery which stood immediately to the north of it, broke and buried the railing, and the only parts now found in *situ*, are the stumps of the pillars and the basement. Fragments of bars and pillars are met with in plenty within the rubbish, but a great number of the bars had, evidently, been removed before the rest were buried.

To the west of the terrace a deep trench, cut through the rubbish, has brought to light the continuation of the railing on that side, but in a comparatively better state of preservation. In the middle of the line right opposite to the sacred tree there was a gate having the side pillars highly ornamented. Probably similar gates originally existed at the four cardinal points, but their traces are no longer visible.

In style, ornament, and material the railing bears a close resemblance to those of Buddhist remains in other parts of India. General Cunningham, adverting to those at Bhilsa, observes, "the style is evidently characteristic and conventional, as it is found wherever the Buddha religion prevails. It is in fact so peculiar to Buddhists that I have ventured to name it the 'Buddhist railing.' This peculiar railing is still standing around the principal topes of Sanchi and Andher, and some pillars and other fragments are still lying around the great topes at Sonari and Sátdhará. The same railing was placed around the holy Bodhi trees and the pillars dedicated to Buddha. The balconies of the city gates and the king's palace were enclosed by it. It formed the bulwarks of the state barge. It was used as an ornament for the capitals of columns as on the northern pillar at Sanchi, and generally for every plain band of architectural moulding. At Sanchi it is found in many places as an ornament on the horizontal bars which separate the bas-reliefs from each other, *Bhilsa Topes*, (p. 187)."

The trench opened on the south of the great temple, has been run close to its base with a view to expose the basement mouldings and the tiers of niches holding figures of Buddha, which were the prevailing ornament of the temple. Capt. Mead has in contemplation to run another trench parallel to the last, but at the same distance from the temple as the trench on the north is. This will most probably bring to light the third side of the railing.

Two or three trenches have been run through the extensive mass of rubbish to the north of the great temple, leading to the discovery of nothing beyond a few cells for resident monks, a great number of whom must have found their living in the neighbourhood of this once sacred spot.

Within the courtyard and opposite to the entrance, stands a small open temple formed of four granite pillars covered over by a heavy stone roofing. In the middle of this there is a large block of basalt, the material so largely used by Buddhist sculptors in the manufacture of their statuary, bearing on its upper surface the carving of two human feet, and a Sanskrit inscription on one side. On the centre of each foot are engraved, within a circle, the figures of a conch, a flag, a lotus, a *swastika* or magic figure of prosperity, a fish, and a few other objects which I could not well recognise.

The name by which this stone is commonly known is *Buddhapad*, or "Buddha's feet." It is remarkable, however, that the inscription on it does not at all allude to Buddha. It begins with the usual Brahminic invocation of "Om," gives the date in S'aka 1230, and records the names of Rávataji and Baladevaji as the dedicators of a temple. The letters are rather smudgy, and the facsimile prepared by me is peculiarly so, it is possible therefore that my interpretation of the monument may be questioned, but the great test of the creed of an oriental document is the salutation at the beginning, and that salutation in the record under notice, being the mystic "Om," which is common both to the Hindu and the Buddhist, it is impossible to determine to which of the two rival creeds the stone is to be assigned. Nor are the emblems engraved on the feet favourable to an easy solution of the question. They conform to no known canons of palmistry Hindu or Buddhist, regarding auspicious marks on the sole of the feet.

The Lalita Vistura, (Chapter 7) in giving an account of the peculiar marks on, and the character of, S'ákya's feet, says "He has expanded hands and feet, soft fresh hands and feet, swift and agile hands and feet (like those of a snake-catcher), with long and slender fingers and toes. On the soles of the feet of the great king and prince (Mahárájá Kumára) Sarvártha-siddha are two white wheels, beautifully coloured, bright and refulgent, and having a thousand spokes, a nave, and an axle-hole. His feet sit evenly on the ground." Such a wheel we look for in vain on the foot-marks at Buddha Gayá. Again in the Museum of the Society there is a large flag of white marble bearing

the figure of a human foot surrounded by two dragons. It was brought from a temple in Burmah where it used to be worshipped as a representation of Buddha's foot. It is 7½ ft. long by 3 ft. 6 inches in breadth, and has on it a great number of mystical marks. On the centre of each toe there is a figure of a conch-shell and a concentric line under it. A conch occurs also at the heel. On the centre of the sole, there is a circular figure with innumerable radii, standing evidently for the wheel with a thousand spokes described above. Around this wheel are arranged, in three tiers, one hundred and eight compartments bearing representations of temples, houses, forests, rivers, men in different attitudes, birds and beasts of various kinds—mostly imaginary, leaves and flowers, magical figures and other objects unintelligible to me. But I do not find the counterparts of these objects in the foot-marks at Buddha Gayá. There the figures are, it is true, included within a circle, but it has no wheel of a thousand spokes. Its prevailing emblems are more Hindu than Buddhistical. The lotus, the *swastika*, the fish and the discus are identically what has been assigned to Vishṇu's feet in the Brahminical shástras. Thus in the Skanda Puráṇa I find the marks on Vishṇu's feet are enumerated at 19, including, 1 a crescent, 2 a water jar, 3 a triangle, 4 a bow, 5 the sky, 6 the foot-mark of cattle, 7 a fish, 8 a conch, 9 an octagon, 10 a *swastika*, 11 an umbrella, 12 a discus, 13 a grain of barley, 14 an elephant goad (ankus,) 15 a flag, 16 a thunderbolt, 17 a jambu fruit, 18 an upright line, and 19 a lotus, of which the first eight belong to the left and the rest to the right foot.* Biswanátha Chakravarttí, in his gloss on the Bhágavat Puráṇa (10th book), has given the marks appropriate to the foot of Rádhá which include, 1 an umbrella, 2 a wheel, 3 a flag, 4 a creeper, 5 a flower, 6 a bracelet, 7 a lotus, 8 an upright line, 9 an elephant goad, (ankus) 10 a crescent, 11 a grain of barley, 12 a javelin, 13 a club, 14 a car, 15 an altar, 16 an earring, 17 a fish, 18 a hill, and 19 a conch.† The first eleven of these belong to the

* चन्द्रार्द्धं कलसं त्रिकोणधनुषी खं गोष्पदं पोष्टिकां।
ग्रङ्कं सव्यपदेऽथ दक्षिणपदे कोणाष्टकं स्वस्तिकं।
छत्रं चक्रयवाङ्कुशध्वजपविं जम्बूर्द्ध रेखाम्बुजं।
विभ्राणं हरिमून विंशतिमहालक्ष्मार्चिताङ्घ्रिं भजे॥

† छत्रारिध्वजवज्रिपुष्पवलयान् पद्मोर्द्ध रेखाङ्कुशं
चार्द्धेन्दुश यवश्च वामचरणे ग्रष्टिं गदास्यन्दनं॥
वेदीकुण्डलमत्स्यपर्व्वतदरं धत्तेलसद्ये पदे।
तां राधां चिरमूनविंशतिमहालक्ष्मार्चिताङ्घ्रिं भजे॥

left, and the rest to the right foot. The scholiast has pointed out at length the different places which these marks should occupy and the objects they subserve at those places. His opinion has been questioned, and Vaisnava writers of eminence have distributed these marks in very different ways. None has, however, to my knowledge, brought them together within a circle on the centre of the sole, as we find them at Buddha Gayá.

The date of the inscription on the Buddhapad is S'aka 1230 = A. D. 1308, and the characters are the nearest remove from the modern Devanágarí. The inscription must have been engraved immediately after the completion of the sculpture of the feet, for it is not likely that the profane hands of an engraver would be allowed to touch a stone, which had been, for any length of time, sanctified by the adoration of thousands, while the Hindu character of the emblems does not permit the supposition of the stone having existed at Buddha Gayá during the supremacy of the Buddhists. They suggest the idea that the foot-marks in question are of Hindu origin, and were put up by Hindus to reduce the place and its old associations to the service of their creed. Such adoption, whether insidious or avowed, of the holy places as well as the rites and ceremonial observances of one sect by another, has been common enough in the history of religion. We meet with it everywhere, and no where more prominently than in India among the Hindus and the Buddhists. There is scarcely one Hindu temple in ten of any great age in which is not to be seen some relic of Buddhism borrowed by the Brahminists. The great temple of Poori, which every year draws together pilgrims by hundreds of thousands from all parts of India, most of whom are prepared to lay down their lives for the truth and sanctity of the holy idol Jagannátha, is a Buddhist edifice built on the plan, and very much in the style, of the sacred monument at Buddha Gayá,* and the idol itself is no other than an emblem of *Dharma*, the second member of the Buddhist triad, represented by the old Pali letters *y. r. v. l. s.*; while tradition still preserves the memory of its Buddhist origin and calls Jagannátha the incarnation of Buddha, *(Buddhávatára)*.† It is not too much

* A closer parallel is met with in the temple of Barrolli near the fall of the Chambul. The domical structure on its top and that of the Poori monument is not however met with at Buddha Gayá.

† Cunningham's *Bhilsa Topes*, p. 358 and Laidlay's *Fa Hian*, p. 21—261. There is an inscription on the temple of Jagannátha which assigns, the temple to Ananga

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then to assume that on the suppression of Buddhism in the 10th and 11th centuries, attempts were made and successfully carried out, of converting Buddhist temples to Hindu usage, and that the foot-marks at Buddha Gayá are the result of one of those attempts.

We have, however, more than *a priori* arguments to establish the fact. In an inscription of the 10th century to which reference has already been made above, it is distinctly stated that a *Buddhapad* or Buddha's foot was set up at Buddha Gayá expressly for the purpose of performing thereon the Hindu rite of *sráddha*. Now as the liturgy of the Buddhists does not recognise that ritual, it must follow as a matter of course that the inscription is a Hindu one, and since its date is posterior to the downfall of Buddhism, it must be taken for granted that those who put it up, desired to reduce Buddha Gayá to the service of Hinduism by, what is commonly called, "a pious fraud."

The inscription itself is no longer traceable at Buddha Gayá. But its translation in the 1st volume of the *Asiatic Researches*, coming from the pen of Sir Charles Wilkins, may be taken as its exact counterpart. It starts by saying that "in the midst of a wild forest resided Buddha the author of happiness and a portion of Náráyaṇa. He was an incarnation of the deity Hari, and worthy of every adoration." The illustrious Amara Deva accidentally coming to the forest discovered the place of Buddha and with a view to make the divinity propitious, performed acts of severe mortification for the space of twelve years. The deity pleased with this devotion appeared to Amara in a vision and offered him any boon that he wanted, and on Amara's insisting upon a visitation, recommended him to satisfy vicariously his desire for a sight of the deity by an image. An image was accordingly made, and Amara eulogised it by calling it Brahmá, Vishṇu, Mahes'a, Dámodara, and by attributing to it all the great deeds performed by Vishṇu in his various incarnations. "Having thus worshipped the guardian of mankind, he became like one of the just. He joyfully caused a holy temple to be built of a wonderful construction, and there were set up the divine foot of Vishṇu for ever purifier of the sins of mankind, the images of the Pándoos, and of the descents of Vishṇu, in like manner of Brahmá and the rest of the divinities.

Bhima Dèva of the Gangá Vansa Dynasty (A. D. 1196,) but he is said to have only rebuilt or repaired what had existed for many centuries before his time and been subjected to many vicissitudes.

This place is renowned; and it is celebrated by the name of Buddha-Gayá. The forefathers of him who shall perform the ceremony of the *Sráddha* at this place shall obtain salvation. The great virtue of the *Sráddha* performed here is to be found in the book called *Váyu puráṇa;* an epitome of which hath by me been engraved upon stone." The inscription writer then goes on to say that Vikramáditya was certainly a renowned king; that there lived in his court nine learned men who were celebrated as the "nine jewels;" that one of them was Amara Deva, and it certainly was he who built the holy temple. The concluding paragraph states that "in order that it may be known to learned men that he (Amara) verily erected the house of Buddha," the writer "recorded upon stone the authority of the place as a self-evident testimony," on Friday the 14th of the wane in the month of Chaitra in the year 1005 of Vikramáditya=A. D. 948.

The writer leaves his readers entirely in the dark as to who he was; he does not even deign to give his name, and he talks of things which happened a thousand years before him. Such testimony can have no claim to any confidence. The value of an inscription depends upon its authenticity and contemporaneousness—upon being a record of circumstances that happened in the time of the writer, who must be a trustworthy person. But here we have none of those conditions fulfilled. We have a tradition a thousand years old, if any such tradition then existed, served up by an anonymous writer on the testimony of so unveracious a witness as the Váyu Puráṇa. The tradition itself bears the stamp of fabrication on its very face. Buddha Gayá, whatever it was in the time of the writer, could not have been "a dreadful forest" "infested by tigers and destitute of human society" in the first century before Christ, when Buddhism in India was in the zenith of its splendour, and when the place of Buddha's apotheosis was held the most sacred spot on earth. Nor could Amara Siñha of the Court of Vikrama who was known to have been a staunch Buddhist* and a clever scholar, be so far

* General Cunningham calls Amara a bráhmaṇa. But in the invocation at the beginning of his Dictionary the great lexicographer has given no reason to his readers to describe him as such. The invocation itself is as follows:

यस्यज्ञानदयासिन्धोरगाधस्यानघागुणाः।
सेव्यतामचयो धीराः सत्रियेचाम्रताय च ॥

"To him who is an ocean of wisdom and mercy, who is unfathomable, and whose attributes are viceless, even to him, O intelligent men, offer ye your adorations for the sake of prosperity and immortality."

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forgetful of his religion as to glorify his god by calling him Hari, Vishṇu, Brahmá, the destroyer of the demon Keshi, the deceitful Vámána who cheated the giant Bali of his dominion, or a little shepherd tied to a post with a rope round his waist for stealing butter from the house of his neighbours. Such stories belong exclusively to the Puráṇas and can never be expected in a Buddhist writing. Then the Amara of Vikramáditya's court and author of the Dictionary was a Káestha, and his surname was Siñha.* I have nowhere seen him addressed as a Deva, which title formerly belonged exclusively to Brahmans and kings, though of late years the rule has been considerably relaxed. The story of the dream is of course a fiction, and the state-

Here the deity invoked is not named; and the commentators having tried to the utmost their ingenuity to apply the verse to most of the leading Hindu divinities, but finding it inapplicable, have one and all taken it to imply Buddha. Mallinatha, the most distinguished among the scholiasts and the author of at least twenty different commentaries, explains the verse thus. "O intelligent men, for the sake of "prosperity," i. e. wealth, of "immortality," i. e. salvation, adore Buddha, whose virtues, whose charities, whose forbearance, &c. &c.

(हे धीरा त्रियै च्छद्ये चाम्रताय मोचाय च स बुद्धः सेव्यतां यस्यबुद्धस्य गुणा दा नम्रोल्लसमादय दत्यादि। MS. As. Soc. Lib: No. 188, p. 5).

Raghunátha, another commentator of some eminence, says: "O intelligent men, Let that Buddha be adored, that is by you. Here, though Buddha is not openly named still it is evident from the epithets used that he is meant. This is called the rhetoric of *prasáda*. Thereof it has been said by Kanthábharana, where the object is evident from the meaning such a figure of speech is called prásáda, thus (the verse) "here rises the breaker of the sleep of the lotus,' without alluding to the dispersion of darkness or the assuaging of the sorrow of the brahmini goose, evidently means the sun." अथवा हे धीराः स बुद्धः सेव्यतां अर्थात् भवद्भिः दृष्टानुक्तोपि बुद्धो विशेषणेन प्राप्तं प्रतीयते दति प्रसादनामायमलङ्कारः। तदुक्तं कण्ठाभरणेन। यत्र प्राकरणमर्थस्य प्रसादः सोभिधीयते दति। यथा, अयमुदयति निद्राभङ्गनः पद्मिनीनामित्यत्र तमोविध्वंसनकोकाशोककरणादिभिरनुक्तोपि सूर्य्यः प्रकारादुपलक्ष्यते। (As. Soc. MS. No. 443, p. 2). Náráyana, another commentator, in the Padártha Kaumudi has reproduced the words quoted above without a remark. (As. Soc. MS. No. 438, p. 1). Ramánátha Chakravarti, after explaining the verse as applicable to Buddha, accounts for the name of Buddha not being openly given in the invocation notwithstanding the epithets used being peculiarly his, by saying "that to conciliate those who are not Buddhists the name of Buddha has not been used." बुद्धविद्वेषिणामेवेति बुद्धशब्दोपादानं न कृतं। (As. Soc. MS. No. 443, p. 1, second series of pagination). This remark has been quoted verbatim by Ragunátha Chakravarti in his commentary on the Amarakosha. (As. Soc. MS. No. 173, p. 1).

* I have no better authority for saying this than the author of the *Káyastha Kaustubha*.

ment of a temple built for Buddha having for its chief penates the image of Vishṇu's feet, those of the five Pandu brothers and of the several incarnations of Vishṇu, is equally so.

It was not expected that a distinguished scholar like General Cunningham with his thorough knowledge of Indian antiquities, should accept the figments of this inscription as true. He has however taken for granted that the great temple was built by Amara Siñha, and, as that individual was a contemporary of Varáha Mihira and Kálidása who, according to Bentley and others, lived in the 5th century, inferred that the temple must have been built in A. D. 500. His arguments are, first the non-existence of any temple in A. D. 400 when Fa Hian visited the place; second, the recorded erection of a large one by Amara Deva about A. D. 500; and third the exact agreement in size as well as in material and ornamentation between the existing temple and that described by Hiouen Thsang between A. D. 629 and 642.

Of these, the most important argument is the first, in which it is said that there was no large temple in existence at Buddha Gayá when Fa Hian visited the place between A. D. 399 and 414. It would at once establish the fact of the great temple of Buddha Gayá being subsequent to the date of Fa Hian's pilgrimage. But on referring to the itinerary of that traveller, I find that instead of his saying that there was no temple, he reiterates the fact that there were several temples in Buddha Gayá at his time, and that the temple near the Bodhi tree was one of them. The account of his travels is unfortunately very meagre. It is a simple recital of names of places and their distances, with a superabundance of legends, but with no topographical details. Still it is very precise as to the existence of temples near the Bodhi tree. Thus in the 31st Chapter (p. 277) we find it stated that at the place where Foe obtained the law *i. e.* near the holy pepul tree, "there are three *Sang kia lan*, and hard by are establishments for the clergy who are there very numerous. The people supply them with abundance, so that they lack nothing." In another place in the same chapter, Fa Hian, describing the approach and residence of S'ákya at Buddha Gayá, says: "The *Phousa* rose, and when he was at the distance of thirty paces from the tree, a god gave him the *grass of happy omen:* the *Phousa* took it and advanced fifteen paces farther. Five hundred blue birds came and fluttered three

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times around him, and then flew away. The *Phousa* advanced towards the tree *Puto*, held out the grass of happy omen towards the east, and sat down. Then the *king of the demons* sent three beautiful girls who came from the north to tempt him, and himself came with the same purpose. The *Phousa* then struck the ground with his toes, and the bands of the demon recoiled and dispersed themselves; the three girls were transformed into old women. During six years he imposed upon himself the greatest mortifications. In all these places people of subsequent times have built towers and prepared images which exist to this day." Lest this be supposed too general, Fa Hian again observes "The four great towers erected in commemoration of all the holy acts that Foe performed while in the world, are preserved to this moment since the *ni houan* of Foe. These four great towers are (1st) at the place where Foe was born, (2nd) at the place where he obtained the law, (3rd) at that where he turned the wheel of the law, and (4th) at that where he entered into *ni houan*." Here we have the positive testimony of the very traveller whom General Cunningham has quoted that a great tower, one of the four largest, existed in his time at Buddha Gayá at the end of the 4th century. But had this evidence been wanting the fact of one of the minor temples at that place having a statue inscribed with the Gupta character of the 4th century, would fully warrant the assumption of the main temple, whose reflected sanctity the little ones sought to imbibe, being considerably older. If we add to this the Buddhist belief reported by Hiouen Thsang and the Ceylonese chronicles, of Asoka having raised a lofty temple at Buddha Gayá, we have ample grounds to assign to the existing temple an age dating from the third century before Christ, and under any circumstance one considerably anterior to the 4th century A. D. of the Christian era.

The second argument of General Cunningham is founded upon the authenticity of the inscription translated by Sir Charles Wilkins, and the deduction of Kálidása, Varáha Mihira and Amara Siñha having been contemporaries in the 6th century. But as I have, I hope, satisfactorily shewn that that inscription is "not historically true," "the claims of reason," to quote the language of Niebuhr, "must be asserted, and we must not take anything as historical which cannot be historical."

As regards the argument founded on the exact agreement in size as well as in material and ornamentation between the existing temple and that described by Hiouen Thsang, it establishes only the fact of the present temple having existed in the beginning of the 7th century, but does not bar the probability of its also having existed many centuries before the advent of that traveller.

Both Hiouen Thsang and the writer of the Burmese inscription of Col. Burney, state that the temple was originally built by As'oka, and we see no reason to doubt their assertion. Bearing in mind how lavish As'oka was in his expenditure for the erection of towers and monuments in all parts of India, it is but natural to suppose that he had selected the spot where the founder of his religion attained to perfection as the most appropriate place for the largest and loftiest of his monuments. That such a monument should have lasted for six hundred years when Buddhism was still on the ascendant, so as to be visible in the time of Fa Hian, is not in the least improbable. No doubt the structure had had several repairs, and it is to these probably that the Burmese inscription, and Hiouen Thsang refer when they allude to the legend of the dream and the consequent "rebuilding" of the monument, but they do not controvert the position of its having been in the first instance erected by As'oka.

P. S. Since writing the above I have read Montgomery Martin's notice of the temple at Buddha Gayá (Eastern India, I. p. 23) and Buchanan Hamilton's description of the ruins at that place (Transact. Rl. As. Soc. II. p. 41). Both allude to the tradition about Asoka's having erected the temple, and express doubts regarding the authenticity of Amara's inscription. Hamilton describes a two-storied room near the temple which I did not see.

Description of a new species of Paradoxurus from the Andaman Islands.—By Col. Tytler.

As the mammalia found on these Islands must be of interest, I beg to send you the following description of a NEW Paradoxurus which I have named after myself,

Paradoxurus Tytlerii.

Length from tip of snout to end of tail 3 feet and 5 inches, of which the tail alone measures 1 foot and 8 inches, and the head about 6 inches, height at shoulder 8 inches, general colour, dark bister brown, thickly mixed with longer light hairs of an Isabeline colour, giving the animal a changeable colour from dark to light according to circumstances; the entire under surface is of a pale Isabeline hue; feet, muzzle, and ears dark, eyes hazel; whiskers white, mixed with a few black hairs; nails nearly white; teeth strong; cheeks dark; light down the nose, and about the eyes; very vulpine in appearance; tail round not prehensile. Naked area or glandular fold between the anus and the genitals; large feet of moderate size; fur very thick and of a moderate length. The above was taken from an adult male. In habits they are very nocturnal, and appear to feed almost entirely on fruit and vegetables. I had two males caught with a great deal of difficulty alive, but they soon died in captivity: I have preserved their skins and skeletons. Their call is rather cat-like, and they appear rather inoffensive in their habits, notwithstanding that at times they fought slightly with each other. I trust this brief account may be acceptable, and if so, should you desire it, I shall be happy when opportunities offer, to send you further notes from these distant islands.

I ought to mention that the Paradoxurus I have described is not very common; the two I obtained were both from Viper Island where they do great havoc amongst pine apples: they are great tree climbers, nocturnal in their habits, and living during the day in holes.

8th June, 1863.

Extract from Journal of a Trip to Bhamo.—*By Dr.* C. WILLIAMS.

February 3rd.—At about midday reached the neighbourhood of Tagoung. The river here runs between a portion of the Mingwoon range of hills, which, covered with forest, slope to the water's edge of the right bank,—and a steep bank of sandstone with a fringe of sand-banks on the left. Its course is from N. to S. About a mile below Tagoung I went on shore with a Burman who professed to know all about the old city. Along the bank on which we walked and which was formed of debris from the sandstone of the steep true bank, we proceeded about half a mile, when we entered a lane to the right, having on our left the old city wall of Tagoung, and on our right a stony and brick strewn rise that appeared to be also a ruined wall: we continued thus due east for about a quarter of a mile, when the wall on our left turned towards the N. E. and the rise on the right continued its easterly direction. On the north side of this latter the ground was on a level with the top of the rise. My guide declared it to be the north wall of Pagan; I rather thought it the run of an ancient counterscarp to the south wall of Tagoung.

I ascended the Tagoung wall with great difficulty, for the jungle, which is thicker and higher on the wall than elsewhere, contained many of the tearing and scratching species of plants that so frequently defy intrusion on a Burman jungle. Its brick structure was everywhere plain, and I should guess its outside height at the south and south-east sides, to be twenty feet. I tried to keep along the low ground close to the wall, but was obliged to submit to be guided round by a path, that after a circuit to the east, brought us to an eastern gateway. The brick work was here very hard and the backing of earth equally so. Just within the gateway were two decayed gate posts smaller than the gate posts of a good-sized Burman compound, but of the same kind, evidently a relic only of the latest period at which the modern village needed or was worth the protection of a gate. The wall here appeared to run due N. and S. Passing into the old city, a jungle path to the North West brought us to the present village of Tagoung, containing by the Thoogyee's account about one hundred houses, which is apparently correct. I called on this official, and found him civil and willing to give me all the information he could, which was not much. At my

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request he drew a plan of the two cities on a parabeit. He confessed, however, that he had not seen the greater part of the wall, and especially did not appear at all certain about old Pagan. On the authority of "they say" however, he drew outlines like the following. (Pl. I.)

As my subsequent inspection rather confirmed this sketch, I give it to serve as a plan for reference.

The Thoogyee with the help of some of the numerous visitors I had attracted to his house, told me that anciently the two cities were surrounded by the river, an arm of which embraced the east sides and rejoined the main stream to the south of Pagan. The remains of this branch of the river he declared to be evident in the creek to the north of Tagoung, and in the fact that during the freshes of the rainy season, the two cities are actually surrounded by running water.

The walls of Tagoung he said followed the water-course, and those of Pagan too were only at a short distance from it. "In the rains, in fact, the two cities form the only dry ground in the neighbourhood." To the eastward a series of jheels and tanks are scattered through the jungle till, at the distance of a deing (two miles) or more, a small lake is met with, extending eight miles from N. to S. and six from E. to W. Beyond this lake is jungle, till the hills that run down from Momest are met about another deing further east.

All united in saying that Pagan is older than Tagoung, and all declared themselves ignorant of its history. "Its chronicles are all burnt," said one: another more intelligently remarked;—"It is not hundreds, nor even a thousand years that the city has ceased to be a capital: before religion came to the country it was the Burman capital, and what old man can tell us of its history?" On my enquiring after any stone inscriptions or other relics of antiquity, they said none have been found except a few small Budh images stamped in relief on bricks with an inscription beneath, that I might perhaps be able to read, but that they could not. They told me that these are all found on the ground within old Pagan, and nothing of the kind has been met with within the walls of Tagoung.

The Thoogyee sent for some pieces, and on examination the character proved to be Nagari, which I recognised, but cannot read when distinct, and this inscription was far from legible.

Taking temporary leave of the Thoogyee, I went through a wide

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gap in the north wall, which seemed mostly levelled with the ground of the city, though its site is plainly marked by the brickwork, and found myself on the steep bank of the creek mentioned by the Thoogyee. Looking northwards, a long stretch of gradually narrowing water appears at last to end in a cul-de-sac amidst dense jungle. This is evidently an old passage, and at present an open one in the rainy season. To the right, close along the wall of the city, stretched a piece of low jungly ground, through which a small stream of water issued into the main creek. I went along this north wall till jungle and approaching darkness stopped me. The line of brickwork was plain enough, and close outside it, the ground sloped to the low swampy jungle which the natives said is covered with deep water every summer.

The present village, I should explain, is situated on the north-west corner of the old city: one or two old pagodas are near and several modern ones. The chief object of reverence to fear, however, is a Nat, which is said to possess great power for evil as well as good, and especially inflicts the stomach-ache on any offender. The material representative of this spirit is a rude head on a post, the whole of wood, about four feet high, with a tapering head-dress, half globes for eyes, a well formed nose and no mouth, but rather big ears. This dreaded image is lodged in a wooden shed like a Zayat, a portion of which, covered by an extra roof, is boarded off into a chamber about six feet square: within this stood the ugly post, amidst earthen vases and little pans in which flowers and lamps had been offered to it. As sketched from memory the outline of the thing was as below. (Fig. 1.)

I have heard of this terrible nat at Mandalay, and have been consulted by a former Thoogya for an incurable stomach-ache and asthma inflicted by it while he was in office here. The nat bears a bad reputation for vindictiveness and being easily offended. The origin of this particular worship at this spot, I will enquire further into before I make any guesses. In the evening I witnessed a striking example of the reverence the nat exacts from all comers to his neighbourhood. My Burman servants had evinced some fear in the day and refused to accompany me in a close inspection of his devilship. At the puey given by the Thoogya in the evening, the actors in which were a company of players from *Moutshobo*, I noticed these latter always making a shiko to somebody I could not see, before

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Fig. 1.

they made the customary one to the entertainer himself. On the constant repetition of this I asked "Who is it they shiko to?" and was told by the Thoogya, "to the Lord nat," and then recollected that the nat shed stood in the direction of the obeisance which had puzzled me.

The inhabitants even dared to tell me that the nat was "teg sothe," very wicked, but in a confidential manner, as if they would not at all like the nat to know they said so.

The next morning, February 4th, was so foggy that I could see nothing. After despatching some letters, by a chance but safe opportunity to Mandalay for posting, I went on shore about 10 A. M., detaining the canoe, and sending on the large boat. I went to the Thoogya who had collected half a dozen of the brick reliefs, all that the village possessed, from which I selected three, and with the ready consent of the Thoogya brought them away. I then started for Pagan, and the Thoogya determined to accompany me. We passed out by a gateway in the east wall, north of that by which I had entered yesterday—where the direction of the wall was N. E. and S. W., and after walking through jungle in a southerly direction

for about half or a third of a mile, entered old Pagan by a pathway passing over a low ill-defined ridge, which the quantity of brickwork in the soil, as well as the assertions of the Thoogyee and followers, made evident as the north wall of old Pagan. To the west and east the same ridge could be seen to extend, but could not be followed for more than a few yards on account of the thick and prickly jungle. About sixty yards to the south, we came on a mass of brickwork, apparently an old pagoda, on which was a rude Budh protected by a modern though dilapidated shed, and with its back against the remains of the original Dzedi. There was nothing peculiar about it, but by the image were several of the brick casts above mentioned, but of a different stamp from those the Thoogyee had shown me at his house. The inscription was here more distinct, and, like the others, in the Nagari character. The Thoogyee permitted me to take the two most perfect. Continuing south for about 500 yards through dense jungle, the narrow path led us to a round pile of bricks overgrown with brushwood and grass, the ruin of a conical pagoda called by the people the "Mwy Zeegoon Phra." We climbed its almost perpendicular side by a path already worn, and from the top, could see how utterly the site of both cities was converted into forest and jungle. The walls could not be traced even in the faintest manner. The low ground to the east, however, was plainly outside the city. Several spots within had been used for "Toungya" cultivation: none had been otherwise made use of. Returning by the same path, for further progress southwards was barred, I got the best of the natives to accompany me to the eastwards, where he said the north-east corner of the city was apparent. We must have wandered through cartways and jungle paths about half a mile to the eastward before we came upon the supposed corner. To the westward I could not trace the wall, but straight to the south we traced distinctly the high brickwork for fully half a mile. To the right was impenetrable jungle the whole way, to the left low ground with occasional patches of forest, and much of the long feathery grass, which only grows in places well watered. This low land, the man said, is covered by water in the summer, and at that time there is a current all along by the wall.

The jungle defied further progress. The guide said that the wall continues straight on southwards for twice the distance that we had come. We now passed through an ordeal of many scratches, and

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struck upon a path within the walls, running south-west. Keeping this general course, we walked I think a mile and a half, and emerged over a line of brickwork on the same level with the top of the sandstone bank, and about a dozen yards within it. Now on the bank of the river I could not afford time to follow the wall line southwards, but from a good mark, (a large tree on the lower bank opposite the gap in the true bank,) I measured with a tape the distance to the apparent north-west corner of the city. This was 104 times 50 feet, or 5200 feet. From this it appears that the natives' account is probably correct, and that the city of Pagan was at least two miles in length from north to south, and probably a mile in breadth from east to west. A thousand feet from the supposed north-west corner of Pagan begins the west wall of Tagoung. This runs directly north for 24 times 50 = 1200 feet, then turns with the bank of the river to the north-east for 500 feet, from which the north wall is apparently continuous along the creek in a due eastward direction. The west wall of Tagoung is evidently a brickwork capping to the natural sandstone bulwark, and thus appears to be parallel with, but somewhat to the west of the west wall of Pagan, which lies behind the natural bank.

The whole was very probably an island in remote times, and it seems that insular or semi-insular positions have been favorite sites for Burmese capitals ; *e. g.* " Poukkan" or Lower Pagan on " Yunhlot" Island, Ava, and this the most ancient of all.

The Thoogyee who had left me after showing the Mwy Zeegoon Phra, now came down to the beach, and seemed a little puzzled at my measuring the old walls. His face bore a queer expression of doubt whether he had not committed a sin in allowing this perhaps dangerous proceeding. He, however, spoke very civilly, and we parted the best of friends, he promising me all the information procurable, on my return. It was now 4 o'clock, and a very cold pull it was to reach the boat, which I found about 8 o'clock, moored beneath the bluff of Tongue, about eight miles up the river. This Tongue is said to have been a capital before Tagoung. Again near Myadoung is a place " Thigine" on the west bank, called the Beloo Myo or Monsters' city, where *the walls are of stone*, and other evidences of superhuman handiwork are talked of. This must be of interest.

I fancy that in former times there were several petty states in the upper Irrawaddi valley, and that the Burmese chroniclers have merely

selected one at a time, and stringing backwards the genealogy of their modern kings, manufactured the tale of a continuous monarchy with a shifting capital and dating from the first inroad of Hindoo princes into the valley up to the present time. I understand from Hindoos that they have in their books some accounts of an incursion of Hindoos into this country.

The ancient extent of Hindoo influence over Indo-China and the adjacent archipelago, I suppose to be a well-proved fact, and the prominence given in Burman chronicles to the advent of the Hindoo prince is very significant.

I should have mentioned above, that the great extent of pond and lake, with the creeks of still water, make Tagoung a remarkably good fishing-place. Great quantities of fish are dried, and much made into "ngapee" and great numbers also are taken alive to the capital. The small-fish are thrown into the boat and kept alive with frequent changes of the water. The larger fish are strung by the gills, or the nose, or the lip, and so towed down the river till the market is reached, At the time of my visit, the cul-de-sac creek to the north of the city was closed at its mouth by a bamboo netting, and the fish above were being narcotised with some bark, that I am as yet unacquainted with. The fish above the net being all taken, the net is removed, when after five or six days, fish enter the creek again and the process is repeated. At this creek and on the river in the neighbourhood of Tagoung, the fish-eating birds are particularly numerous. A few specimens I have shot and had skinned; among them the Scissor-bill (Rhimops nigra) and another very handsome web-footed bird of the size of a duck, with a long neck and a sharp pointed beak. It swims with only its head and neck out of the water, but watches for its prey most generally on the low sand banks, or on some projecting piece of drift wood. Its food is small fish. The Darter.

Note on the Gibbon of Tenasserim, Hylobates lar.—*By Lieut.-Col.* S. R. TICKELL; *in a letter to* A. GROTE, *Esq.*

I send a transcript from my Mammalian collection of what I had recorded of Hylobates lar, at least of its wild and tame habits. Notes on its osteology and soft anatomy and structure, you will not require, as you have a specimen by you, which I suppose from what you say of its paralysis will not live long. The one you have, must have been about 1½ year old when I sent it you. Doubtless captivity has checked its growth. I give the dimensions taken of an adult one, but I think I have seen them larger, and the males are larger than the females, (as in all monkeys).

The Burmese and Talains never keep monkeys of any kind as pets. The Karens sometimes do. Of the Shans I cannot speak, but being Buahists they probably do not either.

HYLOBATES LAR (Ogilby.)

The *Hylobates lar* is found in great abundance in all the forests skirting the hills, which run from north to south through the province of Tenasserim. They ascend the hills themselves up to an elevation of 3,000 to 3,500 feet above sea level, but not higher, and are usually met with in parties of from 8 to 20, composed of individuals of all ages. It is rare to see a solitary one; occasionally, however, an old male will stay apart from the flock, perched on the summit of some vast tree, whence his howls are heard for miles around. The forests which these animals inhabit, resound with their cries from sunrise to about 9 A. M. Their usual call may be thus rendered.

The sounds varying from the deep notes of the adults to the sharp treble of the young ones. During these vocal efforts they appear to

HYLOBATES LAR. L.

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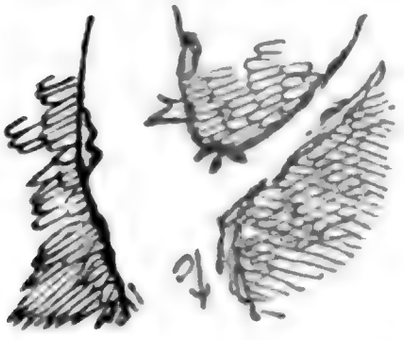
resort to the extreme summits of the loftiest trees, and to call to each other from distant parts of the jungle. After 9 or 10 A. M. they become silent and are engaged feeding on fruit, young leaves, buds, shoots and insects, for which they will occasionally come to the ground. When approached, if alone, they will sometimes sit close,



doubled up in a thick tuft of foliage, or behind the fork of a tree near the top, so screened as to be quite safe from the shot of the sportsman. The sketch in the margin may show how effectually a single gunner may be baffled in his attempts to secure a specimen. With a companion the manœuvre of course is useless. But indeed when forced from its concealment and put to flight, the Gibbon is not easily shot. It swings from branch to branch with its long arms, shaking the boughs all around, flings itself from prodigious heights into denser foliage, and is quickly concealed from view by intervening trees.

If hit, there is no animal more tenacious of life, and its efforts when desperately wounded to cling to the branch, and drag itself into some fork or nook where to hitch itself and die, excite amusement and compassion.

The Gibbon (if we restrict that name to this species) is not nearly so light and active as its congener *H. hoolock*, (the "Tooboung" of the Arakanese,) which latter species is not liable to vary in colour, being always black, with the hands and feet concolorous, and the supercilia only white, instead of a circle of that colour all round the face. The Gibbon, moreover, walks less readily on its hind legs than the hoolock, having frequently to prop and urge itself along by its knuckles on the ground. In sitting it often rests on its elbows and will lie readily on its back. Anger it shows by a fixed steady look, with the mouth held open and the lips occasionally retracted to show the canines, with which it can bite severely, but it more usually strikes with its long hands, which are at such times held dangling, and shaken in a ridiculous manner, like a person who has suddenly burnt his fingers. It is, on the whole, a gentle peaceable animal, very timid and so wild as not to bear confinement if captured adult. The young seldom reach maturity when deprived of liberty. They are born generally in the early part of the cold weather, a single one at

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a birth, two being as rare as twins in the human race. The young one sticks to its mother's body for about seven months and then begins gradually to shift for itself. So entirely does this animal confine itself to its hands for locomotion about the trees, that it holds any thing it may have to carry by its hind hands or feet. In this way I have seen them scamper off with their plunder, out of a Karen plantain garden in the forest.

I have had many of these animals while young in confinement. They were generally feeble, dull, and querulous, sitting huddled upon the ground, and seldom or never climbing trees. On the smooth surface of a matted floor they would run along on their feet and slide on their hands at the same time. By being fed solely on plantains, or on milk and rice, they were apt to lose all their fur, presenting in their nude state a most ridiculous appearance. Few recovered from this state: but a change of diet, especially allowing them to help themselves to insects, enabled some to come round, resuming their natural covering. For the most part they were devoid of those pranks and tricks which are exhibited by the young of the *Macacus* and *Inuus*, though occasionally and if not tied up, they would gambol about with cats, pups, or young monkeys.

The tawny and the black varieties of the Gibbon appear to mix indiscriminately together. The Karens in the Tenasserim provinces consider there is a third variety which they name "Khayóo pabá," and the Talaïns "Woot-o-padyn" (blue ape). This is probably the party-coloured or mottled phase of the animal, whlch occurs very often to the southward, in Malacca. The pale variety is more numerous in the district of Amherst than the black one.

Hylobates lar extends southward to the Straits, and northward to the northerly confines of Pegoo (British Burma): whether it is found throughout Burma proper or not, I cannot ascertain. To the west of the spur dividing British Burma from Arakan, and throughout the latter province into the mountains east of Chittagong, is found only *Hylobates hoolock*. And further northward in the forests and hills of Cachar, Munnipoor and Asám exists either a third species, (not yet I believe distinguished by naturalists,) or if the same species as *H. hoolock*, so strongly modified as to be larger and stouter, with a totally different call, and subject to vary in colour the same as *H. lar* which *H. hoolock* in Arakan is not.

I subjoin the dimensions of an adult male specimen of *Hylobates lar* shot near Hlyng bway, Tenasserim province; January, 1855. But I believe it attains a larger size.

Length from crown to posteriors 1′ 7⅝″

Humerus 9½′, Radius 9½″, Hand 6″, Total 2′ 1″.

Femur 7½″, Tibia 7½″, Foot 4½′. Total 1′ 7½″.

Height when standing upright about 2′ 6″.

I should not omit mentioning the peculiar manner in which this species drinks, and which is by scooping up the water in its long narrow hand, and thus conveying a miserably small quantity at a time to its mouth. It is to be hoped the animal is not much troubled with thirst.

Literary Intelligence.

Extrait du mémoire de Mr. Holmboe *sur l'origine du systeme de poids de l'ancienne Scandinavie.**

Pendant que le système de poids de l' ancienne Rome, constituant la livre de 12 onces était en usage dans une grande partie de l'Europe, la Scandinavie se servait d'un système tout différent, comptant 1 mörk (plûtard dit marc) = 8 asrar (plur de eyrir, plûtard dit öre).

1 eyris = 3 örtugar ou ertugar (plur. de örtug).

On est frappé de rencontrer le même système en usage dans l' Inde méridionale moderne, ou,

1 çer est = 8 palas.

1 pala = 3 tolas,

et plus frappante encore est l'égalité de la pesanteur des poids respectifs des deux contrées si éloignées l'une de l'autre. L'auteur donne deux listes de la pesanteur de l'once (eyrir, pala) dans divers états de l'Europe et de l'Inde, d' où il résulte, que sa pesanteur, quoiqu' un peu variante, se trouve presqu'entre les même bornes ici et là, ce qui est aussi le cas avec l'once de plusiéurs états Mahometans hors de l'Inde.

Il est vrai que, depuis le moyen age, le marc de 8 onces a été en usage dans la plupart des états Européens; mais il faut remarquer, que l'on n'y s'en sert que pour peser l'or, l'argent et un nombre très limité d' autres articles précieux, pendant que la livre de 12 onces

* Communicated in a letter to Babu Rajendra Lal Mitra.

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est le poids principal pour les vivres et les marchandises. Les Scandinaves au contraire se servent du marc, eyrir et ertag pour tout objet pondérable ; et la division de l'once en 3 unités inféreures ne se rencontre nulle part hors de Scandinavie et de l' Inde.

L'auteur a fait des recherches pour trouver des traces du systéme des Scandinaves dans les contrées, qu'ils passaient lors de leur émigration de l'Asie, et par lesquelles un chemin de commerce trés frequenté entretenait les relations entre l'Orient et le Nord jusqu'à l'invasion des Tartares. Le résultat de ces recherches se borne à attirer l'attention sur un grand nombre de lingots d'argent, qu 'il y a une trentaine d'années ont été desenterrés à Riazan, presqu' au centre de la Russie. Or le poids moyen de ces lingots repond de trés près au poids du marc ancien des Scandinaves. Et à Bokhara on se sert aujourd'hui d'une once, dit Tolendak, dont le poids est presque égal à l'ancien eyrir.

Quant à l'origine de l'ègalité des poids du Nord et de l'Inde, l'auteur émet l'hypothése, que le système a été établi chez les ancêtres communs des Ariens de l'Inde et des peuples du Nord. Pour supporter cet hypothése il cite un certain nombre d'articles de civilisation, qui portent les mêmes ou presque les mêmes noms en Scandinavie et en Inde,—articles qui démontrent un degré de civilisation, qui doit nécessairement avoir eu besoin d'un système de poids. Les émigrés doivent donc l'avoir apporté avec eux, les uns vers le Nord, les autres vers le Sud.

Translation.

Extract from the Memoir of M. Holmboe on the origin of the System of Weights in Ancient Scandinavia.

While the system of weights of ancient Rome, comprising the pound of twelve ounces was in use in a large part of Europe, Scandinavia used a very different system, consisting of

1 mörk (afterwards marc) = 8 asrar (plural of eyrir, afterwards called öre),

1 eyrir = 3 örtugar or ertugar (plural of örtug).

One is struck at meeting with the same system in use in modern Southern India where

1 sír = 8 palas,

1 pala = 3 tolahs,

and still more striking is the equality of the respective weights, in two countries so far distant from each other. The author gives two lists of the weight of the ounce (eyrir, pala) in the different states of Europe and India, from which it appears, that although its weight varies somewhat, the variation has almost the same limits in both quarters, which is also true of the ounce in several Mahometan states external to India.

It is true that the marc of 8 ounces has been in use in most European states since the middle ages: but it must be remarked that it is only employed there for the weighment of gold, silver, and a very limited number of other precious articles, while the pound of 12 ounces is the chief weight for provisions and merchandise. The Scandinavians on the contrary use the marc, eyrir and ertag, for every weighable object; and the subdivision of the ounce into 3 units of lower value, is met with nowhere but in Scandinavia and India.

The author has sought for traces of the Scandinavian system in the countries which that people traversed in their emigration from Asia, and through which passed a well-frequented commercial route, by which Eastern and Northern nations communicated, up to the time of the Tartar invasion. The result of these researches is limited to drawing attention to a great number of ingots of silver which were dug up at Riazan, almost in the centre of Russia; the weight of these ingots corresponds very closely to that of the ancient marc of the Scandinavians: and at Bokhara, according to Tollendak, an ounce is still in use, the weight of which is almost equal to that of the ancient eyrir.

As to the origin of this equality in the weights of the North and of India, the author suggests that the system was established by the common ancestors of the Arians of India and of the Northerns. In support of this view, he cites a certain number of articles of civilization which bear the same names in Scandinavia and India,—and which indicate a degree of civilization which must have absolutely required a system of weights. The emigrants then carried this with them; some to the North, the others to the South.

H. F. B.

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Dr. E. Buhler *on Çâkaṭâyana's Sanskrit Grammar.*

I lately received through the kindness of my friend Mr. W. Stokes of Madras, part of a transcript of MS. 1071 (Alph. Cat. E. T. H. Col.) as well as the beginning and end of MSS. 1072 and 1073, which in the *Catalogue raisonnè* as well as in the Cat. Alph. are stated to contain the ancient grammar of Çâkaṭâyana, the predecessor of Yâska, Pâṇini and the author of the Mahâbhâshya.

On examination, MS. 1071 proves to contain a copy of the Çabdânuçâsana of Çâkaṭâyana with the Chintâmaṇi Vritti of Yaxavarman (beginning on fol. 31 of the original MSS., p. 149 of my transcript). The first thirty-one folios contain a compendium based on the same work, in the style of the Siddhântakaumuḍi. Its author and title I am unable to ascertain, as it is full of breaks in the beginning and in the end. MS. 1072 contains a work called Prakriyâsamgraha by Abhayacandra-siddhânta-sûri, likewise giving sûtras from the Çabdânuçâsana, but if it is commentary or an abridgment of the original I cannot say. MS. 1073 resembles closely MS. 1072; its title and author are not named.

Though I only possess about 1¼ pâda of the first adhyâya of the Çabdânuçâsana I venture to give a notice of the work without waiting for the completion of the transcript, as I think it can be proved satisfactorily, that that work really belongs to the predecessor of Pâṇini. Besides, the above-mentioned compendium allows me to form a general idea of the whole work.

In order to prove the correctness of the title given, I give the text of the introductory verses of the Chintámani:

Vîtarâgâya namah.
Çriyam kriyâdvah sarvajñânajyotira naçvarim.
Viçvam prakâçay-*accintámaniçcin*târthasâdhanah. (1)
Namastama(h) prabhâvâbhibhútabhûdyotahetave.
Lokopakâriṇe çabdabrahmaṇe dvâdaçâtmane. (2)
Svasti çrisakalajñânasâmrâjya, padamâptavân.
Mahâçramaṇa-samghâdhipatir-yah *çâkaṭâyanah*. (3)
Eka ççabdámbudhimbuddhimantharena pramathya yah.
Sayaçah çvi samuddadhre viçvam vyâkaraṇâmṛitam. (4)
Svalpagrantham sukhopâyam sampûrṇam yadupakramam.

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Çabdânuçâsanam sârvam arharcchâ sanvatparam. (5).
Eshṭirneshṭâ na vaktavyam vaktavyam sûtratah prithak.
Samkhyâtam nopasamkhyânam yasya *çabdânuçâsane*. (6)
Tasyâtimahatîm vṛittim samhṛityeyam laghîyasî.
Sampûrṇalaxaṇâvṛittirvaxyate *yaxavarmaṇâ*. (7)
Grantha-vistara-bhîrûṇâm sukumâradhiyâmayam.
Çuçrûshâdiguṇân kartum çâstre samharaṇodyamah. (8)
Çabdânuçâsanasyâ nvarthâyâç *cintâmane* ridam.
Vritter granthe pramâṇamtu *shaṭsahasram* nirûpitam (9)
Indracandrâdibhiççâbdair yaduktam çabdalaxaṇam
Tadihâstisamastam ca yannehâsti na tatkvacit. (10)
Gaṇadhâtupâṭhayor gaṇadhâtu *lingânuçâsane* lingagatam.
Uṇâdikâ *nuṇâdau* çesham niççeshamatra vṛittau vidyât. (11)
Bâlâbalâjanopyasyâ vṛitter abhyâsavṛittitah.
Samastamvâñgmayam vetti varsheṇaikena niçcayât. (12)

With these statements we must compare the end of the first chapter, which runs as follows:

Iti çabdânuçâsane cintâmaṇivrittau prathamasyâdhyâyasya prathamah pâdah.

Though there can be no doubt that the MS. contains the work of Çâkaṭâyana, still it remains to be proved that this Çâkaṭâyana is the predecessor of Pâṇini. For the name Çâkaṭâyana is a *nomen gentile* and does not originally designate one individual only. Besides we know from the commentaries on the Dhatupâṭha that there were two grammarians of this name.

Fortunately it is not difficult to decide this question, as Pâṇini quotes in three passages opinions of Çâkaṭâyana,—pûjârtham as the commentators say. Two of these rules are found in the fragment of the Çabdânuçâsana, which I have before me, the third is wanting because it refers to a matter treated of in one of the later books. The rules referred to are the following:

Pâṇini teaches viii. 4. 46.

Aco rahâbhyâm dve (scil. yare vâ).

Consonants with the exception of *h* (and of course also of *r*) standing after an *r*, or *h*, which is preceded by a vowel or diphthong, can, optionally, be doubled.

And viii. 4. 47.

Anaci ca.

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(This doubling may also take place) if consonants except *h* and *r*, which are preceded by a vowel or diphthong, are followed by any letter except vowels, diphthongs *h* or *r*, (or if they stand at the end of a word).

In the following Sûtras he gives exceptions to these rules and says S. 50.

Triprabhṛitishu çâkaṭa'yanasya (na syât).

If three or more consonants follow each other (which otherwise fulfil the conditions stated above) the doubling shall not take place according to the opinion of Çâkaṭâyana, e. g.

Çâkaṭâyana allows only the pronunciation indra, not inndra.

In the Çabdánuçâsana we find the following corresponding rules:

I. 1, 117.

Acohrohracah, (dve vâ syâtâm) Cintâmaṇi: Acah paro yo hakâro rephaçca tâbhyâm parasya ahracah, hakârâdrephâdacaçcânyasya varṇasya sthâne dve rûpe bhavato vâ, brahmmâ brahmâ, sarvvah sarvah, dírgghah dirghah, ahraca iti kim, barhit, dahrah aham.

Translation of the Sûtra:

Consonants except 'h' or 'r' following an 'h' or 'r,' which is preceded by a vowel or diphthong, may optionally be doubled.

Sûtra I. 1. 118.

Adîrghât.

Cintâmaṇi:

Adîrghâdacah parasyâ hracah-sthâne dve rûpe bhavato vâ, daddhyatra dadhyatra, patthyodanam pathyodanam, tvakk tvak, tvagg tvag, go-nu-ttrâtah go-nu-trâtah, anvityadhikârât (from Sûtra 115 çaronu dve) kutvâdau kutve dvitvam, adîrghâdeka halîtyanuktvâ na samyage (Sûtra 119) tvacîti (Sûtra, 101) yogadvayârambhât, virâme pyayamâdeçah ahraca iti kim sahyam, (?) varyyah, aryyah titau, adîrghâditi kim, sûtram, pâtram, vâk.

Translation of the Sûtra:

Consonants except *h* and *r* preceded by a short vowel and followed by any letters (except those specified in the following rules) or Virâma, may optionally be doubled.

Sûtra I. 1. 119.

Na samyage.*

Cintâmaṇi.

* MS. na samyago.

Halonantarâh samyagah, samyage pare ahracah sthâne dve rûpe na bhavatah, indrah, (kṛítsnam.)

Translation of the Sûtra:

If consonants except *h* and *r* are followed by a group of consonants, the doubling does not take place.

The last Sûtra apparently contains the opinion ascribed to Çâkaṭâyana by Pâṇini in his rule VIII. 4. 50. At the same time it must be observed that Pâṇini says in VIII. 4. 52.

Adîrghâdâcâryâṇâm,—All the Açâryas forbid the doubling of a letter preceded by a long vowel, and that Çâkaṭâyana who must be regarded as one of the Achâryas teaches the same thing in the Sûtra 118 just quoted.

The second passage occurs Pâṇ. VIII. 3. 18. After having taught VIII. 3. 17. that the Visarga must be changed to *y* after a penultimate 'a,' 'â' and 'o' in the words aghah, bhoh, bhagah he (VIII. 3. 18.) continues.

Vyor laghuprayatnatarah Çâkaṭâyanasya and *v* and *y* (following *a*, *â* or *o* in the three words mentioned) are to be pronounced with less effort (movement of the tongue) than usually—according to the opinion of Çâkaṭáyana.

Çâkaṭáyana's sûtra, I. 1, 154, contains precisely the same rule.

He teaches I. 1. 153.

Vyoshyâ gho bho bhagoh, (scil. gluk).

Cintâmaṇi.

Avarṇâdagho bho bhago etyetebhyaçca parasya padântasya vakârasya yakârasya câshipare glug bhavati (gluk supplied from sûtra 152), vrixa hasati (?) vṛixavṛiçcamâ caxaṇovṛica (?); devâ yânti; agho hasati, bho dadâti, bhago dehi; padânta iti kim, gavyam, jayyam, bhavyam.

Translation.

A final 'v' and 'y' following a short or long 'a,' or the words aghoh, bhoh, bhagoh, must be elided before soft sounds (vowels, diphthongs and soft consonants).

Sûtra I. 1. 154.

Acyaspashṭaçca, (glug).

Cintâmani.

Avarṇâd-agho-bho-bhagobhyaçca paryoh padântantayorvyoraci pare glugaspashṭaḥ avyaktaçrutiçcâsanno bhavati, paṭau paṭav'*u, tau tay'*u,

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agho u aghoy'*u, agho atra aghoy'atra, bho atra bhoy'atra, bhago atra bhagoy'atra, gluci gita iti sandhipratishedhah.

Note.—In the cases marked by * the MS. has y and v instead of y', v'.

Translation.

And if *v* and *y* (in this position) are followed by a vowel or diphthong, then the elision is not clearly audible; (i. e. the pronunciation of the *v* and *y* is unarticulated and the letters are hardly audible).

I add the explanation of the word aspashṭah given in the above-mentioned compendium. There we read:

...aspashṭah aspashṭaçrutih praçithila sthânakaraṇaparispandaçca âsannah vakâro yakâraçca.....

Again it must be observed that Pâṇini says VIII. 3. 22. hali sarveshâm—*All* the (old) grammarians prescribe the loss of such a *v* and *y*, if it is followed by consonants; and this rule is certainly contained in Çâkaṭâyana's Sûtra, I. 1, 153.

After this, I think, there can be hardly any doubt that the author of the Çabdânuçâsana was the predecessor of Pâṇini.

But, in order to make doubly sure, I will adduce another proof for this relation, which seems to me to be still more conclusive.

Pâṇini teaches V. 2. 124: vâco gminih.

The word vâc takes the affix gmini (in the meaning of matu).

The Calcutta Pandits who prepared the first edition of Pâṇini understood the Sûtra so, that the real form of the affix was gmin, and consequently formed the monster vâggmin (with double g.). They even misled Dr. Boethlingk (see his note to the Sûtra). Benfey* and Aufrecht† understood the Sûtra rightly and formed vâgmin. The latter form alone occurs in literature, and is the only correct one. The obscurity of the Sûtra is caused by Pâṇini's negligence. He has omitted to state that the letter 'g' is prefixed to *min* only in order to indicate that the final of *vâc* does not become nasal, as it ought, according to the Sandhi rules. He has taken the Sûtra, with a slight alteration, from Çâkaṭâyana's grammar, where according to the Compendium, it is read thus: vâco gmin.

It is perfectly intelligible in Çâkaṭâyana's system, as there a prefixed 'g' constantly means "no Sandhi." The author of the Compendium says in commenting on the Sûtra:

* Vollst. Sankt. gr. aff. min. † Uṇâdisûtras glossary s. v. vâgmin.

Gakâro-nunâsikanivṛittyarthah.

The letter 'g' is put in order to forbid the nasal.

On other occasions Çâk. forms gluk (g + luk) in order to indicate an elision which causes hiatus, e. g. in devâ âyânti for devâh âyânti. (See the above Sûtra I. 1. 153 and the Cintâmaṇi thereon). Here we have a clear instance, where a Sûtra of Pâṇini presupposes the existence of the system of Çâkaṭâyana.

For an abstract of the contents of the first and second half-pâda of the first Adhyâya I must refer to the Journ. B. B. R. A. S. Here I must content myself with saying that they contain Samg'nâ, Paribhâshâ, Sandhi rules, and the beginning of the declension.

From a comparison of these rules with the corresponding ones of Pâṇini as well as other parts occurring in the Compendium, it can be clearly established that Pâṇini's grammar is a very much *amplified and corrected edition* of Çâkaṭâyana's, and by no means what we should call an independent and original work.

A great many technical terms and names of affixes and roots he has directly borrowed from his predecessor: e. g.

1. Technical terms.

Yuvan, vriddha (which Pâṇini uses *sometimes* for gotra, upasarga, avyaya, taddhita, kṛit, dîrgha, pluta, hrasva, nap, sup, dhâtu, pratyaya, ghi, ghu, etc.

2. Affixes.

Vatú, ḍati, çnâ, çap, çi, ñgî, ḍâc, evi, jhi, çatṛi.

3. Roots.

Kriñ. The commentaries give the roots, as far as I have observed, *always* in the same forms as Pâṇini. The part of the text before contains no other roots than kṛiñ. As Çâkaṭâyana's Dhâtupâṭha is in existence, I hope to be able hereafter to give further details on the subject.

4. The Gaṇas resemble very closely those of Pâṇini. In the Compendium I find the Gaṇa svarâdi at full length, and it is nearly the same as that given by the Calcutta Paṇḍits in their edition of Pâṇini, except that it comprises also the gaṇa prâdi. Besides I find the gaṇas ûryádi and sáxádádi mentioned in Çâkaṭáyana's grammar. The Gaṇa páṭha belonging to Çâkaṭâyana's Çabdánuçásana is said to be in existence.

Besides many entire Sûtras have been borrowed by Páṇini from his

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predecessor, e. g. Tirontardhau I. 4. 71. upádayo bahulam, III. 3. 1. nirváṇováte, VIII. 2. 50. etc.

One of the questions, connected with this book, which will perhaps excite the greatest interest is, whether Çâkaṭáyana really was a Jaina or Bauddha, as we are led to think on account of his title maháçramanasamghádhipati "moderator of the convention of the great Çramaṇas." The word samgha—"convention"—shows, that he belonged either to the Bauddhas or Jainas, and his commentators, who are all Jainas, of course desire to show that he was of the latter persuasion.

I cannot venture to express at present any definite opinion on the subject. But I believe that Çákaṭáyana was *not* a Brahman, and should not be at all astonished, if it were established by additional evidence, which I hope will soon come into my hands, that he was a follower of Çákyamuni.

Extract from a letter from L. Bowring, *Esq., dated Bangalore, 22nd March*, 1864.

I may take this opportunity of mentioning that the Malnáḍ or hill portion of Mysore through which I have recently marched, possesses a great number of inscriptions, some of the Anagerudi dynasty, others of the Kaḍamba Rajas, and others again of the Skêri House who ruled these wild tracts up to the time of Hyder Ali. The inscriptions are, with very few exceptions, in what is called Hale Kannaḍa or old Canarese, and are read with difficulty. They are invariably on large slabs placed upright in the ground, and generally with no protection from the weather. A great many of these inscriptions were copied and sent to Bengal by Dr. Buchanan, who visited Mysore under orders from Government in the beginning of the century and wrote a very interesting account of his tour, in three volumes. Mr. Walter Elliot also, of the Madras C. S., collected a great number of these inscriptions, but I do not know whether the results of his labours were communicated to the Society at Calcutta. I purpose some day, if I can secure the services of a qualified copyist, to have all that can be found in the country copied systematically.

The most interesting traces of ancient time that I have seen in the Malnáḍ are those of the Jain sectarians. Formerly there was a noted dynasty of Jain Rajas, called the Belál Rai Rajas, who ruled both above

and below the ghâts, their head-quarters being at Halebid where there is a splendidly carved temple. It is fifteen miles from Hassan. These Jain Rajas fell before the followers of Shankar Áchárya and the Vaisnavas about 800 years ago, the last Jain Raja having deserted his faith and become a believer in Vishnu, taking the name of Vishnu Vardhana. The head of the Smártas, the Sringagiri Swami, is now supreme in the Malnád country. However, Jains are still found in great numbers, and, in the remoter parts, the Heggades or Potails are generally of that faith, so that it is not unusual to find in a village a Jain Bastí, as the covered-in temples are called, with a large standing image of one of the twenty-four personifications. The present principal seat of the Jain religion is Srávana Belgul, about fifty miles north of Mysore, where there is a colossal statue of Gomateshwar hewn out of the summit of a hill, and looking northwards over the country. It is about forty-five feet high, and, though too broad in the shoulder and arms, is a fine figure. The legs are dwarfed, owing I presume to the figure having been undertaken on so gigantic a scale, that great expense would have been entailed by carving the lower extremities down to their full length. In the "Bastí," in the centre of which this image stands, there are seventy-two figures about three feet high, all of black stone, representing the different attributes of the divinity, each on its own váhana or vehicle. I incline to think that if the history of the Jains in the western part of Mysore were methodically taken up and investigated, it would be an interesting subject of research. There are few literate men in the hills; and the Brahmins are very ignorant regarding all inscriptions, as an instance of which I may mention, that when at Kalas, near the sources of the Tungabhadra river, I enquired whether there were in the Devasthan there any incised slabs, and was answered in the negative; but on visiting it in the evening, I found twenty-six stone Shásanas in Canarese (one of Saliváhan 1132), one in Devanágari and two on copper plates. This part of the country is, however, very wild, and, so far as I could ascertain, no European had been to Gangámul (the sources of the Tungabhadra) for twenty years before my visit. There is a proverb that the Kalas Mágani (Taluk) is a country of 3000 pagodas, 6000 hills, and 12,000 devils. The scenery in it is very fine.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1864.

The monthly general meeting of the Asiatic Society was held on the 2nd instant.

Dr. T. Anderson, Vice-President in the chair.

The proceedings of the last meeting were read and confirmed.

The annual accounts of the Society for 1863, were submitted.

It was proposed by Colonel Dickens, and seconded by Mr. Blanford, that the thanks of the Society be voted to the auditors for their labours in auditing the Society's accounts. The proposition was carried unanimously.

Presentations were announced—

1. From Lieutenant R. C. Beavan, a copy of "Westwood's Oriental Entomology."

2. From Baboo Prosonno Coomar Tagore, two copies of the Dáyabhága with six commentaries, published by himself.

3. From W. T. Blanford, Esq., Deputy Superintendent of the Geological Survey of India for Bombay, specimens of land crabs and a grouse.

4. From His Highness Hekekyan Bey, C. E., a copy of his treatise on Egyptian Chronology.

Colonel Guthrie exhibited a remarkably fine pair of Wapiti horns.

The Chairman announced that a deputation had waited upon the Right Hon'ble Sir John Lawrence, with the following address requesting His Excellency to become the patron of the Society, and that he had been pleased to accept the office in the terms of the subjoined reply.

ADDRESS.

"To His Excellency the Right Hon'ble Sir John Laird Mair Lawrence, Bart., G. C. B., K. S. I., *Her Majesty's Viceroy and Governor-General of India.*

"On the part of the Asiatic Society of Bengal, we, its President and Members, respectfully solicit that your Excellency will be pleased to accept the office of patron of the Society.

"Founded in 1784, by Sir William Jones, the Asiatic Society has, for 80 years, devoted its labours to the advancement of Asiatic science, whether that science be the record of the works of man, or the investigation of the phenomena and laws of nature. The history, literature and philosophy of India, the laws and customs of its people, the architecture of its ancient cities, and the languages and dialects of its numerous races of past and present time, have been largely recorded and elucidated by the labours of the many eminent men whom the Society has been proud to enroll as its members. On the other hand, the geography and physical structure of India and Southern Asia, the Fauna and Flora of this and neighbouring countries, their climatal phenomena and the physical laws of nature, to a knowledge of which modern civilization is so largely indebted, have equally been objects of the studious researches of the Society, and the numerous volumes of its publications, and the large and valuable collections in its museum, amply testify to the zeal and skill with which these objects have been pursued.

"Furthermore in all questions bearing on the material progress of this country, the Asiatic Society has ever taken an active interest, and much valuable information on the mineral resources of India, on the geography and people of the frontiers, on the practicability of new trade routes, and similar matters directly affecting the wealth or intelligence of the country, has been amassed and recorded in the researches and journals of the Society.

"To the co-operation of the Indian Government and the enlightened appreciation and sympathy of your Excellency's predecessors, the Governors-General and Viceroys of India, the Society has been in no small degree indebted for that measure of success which has attended its labours. The establishment of the geodesical, geological and

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hydrographic surveys of India, and of botanic gardens under the superintendence of a series of able and accomplished men of science, the formation of an Oriental fund for the publication and diffusion of ancient Indian literature, the appointment of a Government archæologist, and the grant of pecuniary aid which the Asiatic Society has for many years past received from Government for the support and extension of its museum, bear ample witness both to the independent and co-operative action of Government in furthering those objects, for the advancement of which the Society was originally founded. The contemplated transfer of the Society's collections to Government as the nucleus of an imperial museum, and the measures now pending for a more general and systematic registration of meteorological observations, are further actual evidence of a similar enlightened disposition, and in your Excellency's acceptance of the office of its patron, the Society will receive an assurance that under your Excellency's rule, the advancement of science in its widest sense, the rescue from oblivion of the records of the past, the observation and orderly co-ordination of actual phenomena under the influence of human thought, and the wider diffusion of the embodied results of human experience for the instruction of the future, will not less than heretofore be deemed worthy objects of an enlightened and progressive Government."

HIS EXCELLENCY'S REPLY.

"To the President and Members of the Asiatic Society of Bengal.

"Gentlemen,—"I accept with pleasure the office of patron of the Asiatic Society of Bengal; and I can assure you of my earnest desire to do all that I legitimately can, for the furtherance of the important objects which the Society has at heart.

"I have perused with much interest the statement embodied in the address just presented, regarding the results already accomplished by the Society, and the ends towards which it is still striving. I am persuaded that the Society's operations are well worthy of co-operation and encouragement on the part of the Government in this country, in that they foster those scientific studies which practically conduce to civilization, and to material progress; while on the other hand, they effect great moral good by guarding the valuable

associations of the past; and by keeping alive our sympathies with the Oriental mind and character. Thus it is, that the work of your Society conduces both to European and to Native interests in India, and tends to strengthen the bonds of union between the rulers and the people.

"I trust, gentlemen, that we may preserve the memories and traditions of the great and good men who have adorned this Society during the eighty years of its existence, and that the example of their learning and wisdom may animate and inspirit us in our efforts for the future.

"I beg that you will receive the expression of my best wishes for the continued success and prosperity of the Asiatic Society of Bengal."

(Signed) "JOHN LAWRENCE."

Calcutta, 8th February, 1864.

Letters from Messrs. H. Stainforth, A. M. Monteath, Captain J. Davidson and Major A. D. Dickens, announcing their withdrawal from the Society were recorded.

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members:

H. R. Spearman, Esq.; C. J. Wilkinson, Esq.; F. A. Pellew, Esq., C. S.; Baboo Jagadánund Mookerjee; Lieutenant E. A. Trevor, Dr. W. J. Palmer and Lieutenant G. M. Bowie.

The following gentlemen were named for ballot as ordinary members at the next meeting:—

J. L. Stewart, Esq., M. D., Assistant Surgeon, Lahore,—proposed by the President, and seconded by Mr. H. F. Blanford.

Professor H. Blochmann,—proposed by Captain Lees, and seconded by Mr. H. F. Blanford.

The Rev. W. G. Cowie, Domestic Chaplain to the Right Rev. the Lord Bishop of Calcutta,—proposed by the Bishop, and seconded by the Rev. M. D. C. Walters.

The Hon'ble Maharaja Mirza Vijaya-rám Gajapati Raz, Munniam Sultan Bahadur of Vizianagram,—proposed by Rajah Sutto Shurn Ghosal Bahadoor, and seconded by Moulvi Abdool Luteef Khan Bahadoor.

Communications were received—

1. From R. H. Barnes, Esq., abstract of the meteorological observations taken at Gangarowa near Kandy, in Ceylon, for July and August, 1863.

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2. From Baboo Gopeenauth Sen, an abstract of the results of the hourly meteorological observations taken at the Surveyor General's Office, Calcutta, for December last.

3. From the Punjab Auxiliary Committee to the Asiatic Society, through Dr. A. Neil, the following papers—

I. On the geological features, &c., of the country in the neighbourhood of Bunnoo and the sanitarium of Shaikh Boodeen.

II. Extract from a report by Captain H. Mackenzie on the antiquities of Guzerat.

III. Inscription on the Dharian Baolee.

IV. Inscription on the Mugbura at Hailan.

V. Illustrated table of coins occurring in the bazars of the district.

4. From Lieutenant-Colonel R. C. Tytler, through Mr. Grote, observations on a few species of Geckos alive in his possession.

Baboo Rajendra Lal Mitra then read his paper on the Buddhist remains of Sultangunge.

The paper having been read, a vote of thanks was passed to the Baboo for his interesting remarks.

In consequence of the lateness of the hour, the paper on the antiquities of Guzerat by Captain Mackenzie was not read.

The meeting was then made special, pursuant to notice, in order to decide upon the proposition of the Council, relative to the transfer of the Society's museum to Government.

The Chairman reported to the meeting, that in accordance with a vote passed at the ordinary monthly meeting in January last, the correspondence with Government on the subject of the transfer of the museum had been circulated to non-resident members, and their votes taken on the following proposition:—

"That the Council be authorized to enter into definite and conclusive arrangements with the Government of India, relative to the proposed transfer of the Society's museum, in accordance with the terms of the correspondence."

The result was—

For the proposition, 73.

Against, 1.

Majority in favor of transfer, 72.

The proposition was then put to the vote of the meeting by the Chairman, and the votes were found to be as follows:—

For the transfer 17.

Against, none.

The sum of the votes of resident and non-resident members were therefore as follows:—

	For the proposition.	Against it.
Resident members, ...	17	0
Non-resident members, ...	73	1
Total,.....	90	1

And the proposition was carried.

For April, 1864.

The monthly general meeting of the Asiatic Society of Bengal was held on the 6th instant.

A. Grote, Esq., in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were announced—

1. From his Highness Prince Gholam Mohammad, a copy of "Blagdon's History of India," and a copy of his revision of a work entitled "The History of Hyder Shah and of his Son Tippoo Sultan," with a framed portrait of his father, Tippoo Sultan.

2. From the editor of the *Calcutta Christian Intelligencer*, the three first numbers of his magazine for 1864.

3. From Captain C. Mead, Royal Artillery, through Baboo Rajendra Lal Mitra, a stone slab from Buddha Gaya bearing a Sanscrit inscription.

4. From Major H. Raban, ear-rings worn by a Rengmah Naga chief, being made of the hair of three enemies of the Angami Naga tribe, killed in fight.

5. From Col. J. C. Brooke, specimens of minerals from the Aravalli Mountains.

6. From Dr. Anderson, two botanical and some zoological pamphlets.

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7. From J. Avdall, Esq., a copy of Victor Langlois' "le Trésor des chartes d'Arménie ou Cartulaire de la Chancellerie Royale des Roupéniens."

The Secretary exhibited some photographs by A. C. Crommelin, Esq., of the fossil lately discovered by Major Gowan, in the Mahadeva sandstone of Central India. He had received information from Mr. Carnac that the fossil in question was now on its way to Calcutta, and it would be necessary to await its arrival before its nature could be confidently determined.

Colonel Guthrie exhibited a pair of elephant tusks of unusual size.

A letter from Dr. Archer intimating his desire to withdraw from the Society was recorded.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members:—

J. L. Stewart, Esq., M. D.; H. Blochmann, Esq.; the Rev. W. G. Cowie; and the Hon'ble Maharaja Mirza Vijaya-rám Gajapati Raz, Munniam Sultan Bahadur.

The following gentlemen were named for ballot as ordinary members at the next meeting:—

Dr. Bird, Civil Surgeon, Howrah,—proposed by Mr. Blanford, seconded by Dr. Anderson.

N. S. Alexander, Esq., C. S.,—proposed by Mr. W. L. Heeley, seconded by Mr. Blanford.

Dr. J. B. Barry,—proposed by Mr. Blanford, seconded by Dr. Partridge.

G. W. Cline, Esq.,—proposed by Mr. H. F. Blanford, seconded by Mr. W. L. Heeley.

Baboo Ramá Nath Bose,—proposed by Baboo Rajendra Lal Mitra, seconded by Baboo Jadava Krishna Siñha.

The following letter from J. Mulheran, Esq., on the subject of the caves of Ajunta and Ellora, addressed to Colonel Thuillier, was read:—

"Having lately visited the Fort of Dowlatabad, and the caves of Ellora and Ajunta, and taken a number of photographs of the same, in compliance with the wish expressed in your letter of the 6th October, 1863, I beg prominently to notice that there is a large slab in one of the recesses of the Jumma Musjid of the Dowlatabad Fort, which is covered with Pali characters similar to those in cave

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No. 26 at Ajunta. I beg to add that I have no doubt that this building, although now known as the Jumma Musjid, existed long prior to the times of Mahomed, and that it was originally used as an audience hall by the ancient kings of the country. It is upwards of 150 feet in length, and has three rows of remarkable stone pillars running along its entire length. Since its occupation by Mahomedans a dome of brick has been added to the centre.

"2. As Dowlatabad was formerly known as Deoghur, and is believed to have been fortified by Buddhists, I feel convinced that a translation of the characters to which I have referred, will throw light not only upon the date of the fort itself, but upon the dates of the neighbouring caves of Ellora and Ajunta. The inscription at present is covered with *chunam*, or rather with two or three coats of white-wash; but having removed a portion of these, I am able to state that the characters are in perfect preservation. A sketch accompanies [this letter] showing the position of the slab referred to, which is nearly 4 feet square, and has, I believe, hitherto escaped notice.

"3. Owing to the kind aid of Major Gill, who has charge of the Ajunta caves, I was able to take a dense negative of the interior of cave No. 26, and as he has already furnished the Madras government with *facsimiles* of the Pali inscription of the Ajunta excavations, I would respectfully suggest his being asked, through the Resident of Hydrabad, to furnish a copy of the inscription in the recess of the Dowlatabad Jumma Musjid.

"4. No reference having been made to the caves at Mahore in any work hitherto published, I beg to mention that Captain Pearson accompanied me over portions of those in one of the ravines under the town of Mahore, and that they are similar in character to the caves of Ellora aud Ajunta. All, however, are at present more than half full of mud, little more than the heads and arms of the sculptured figures being visible. I beg further to notice that there are a number of remarkable stone temples known as Himarpanti, or Demon erections, scattered over the country between Ellora and the Godavery, which the people admit to be of Buddhist origin; the tradition relating to them having reference to one of the Buddhist kings of Ceylon of the name of Raon, who is annually slaughtered in effigy by Hindoos of all denominations.

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"5. I have not yet been able to obtain access to papers in the possession of the Jains of Berar, which would, I feel convinced, throw light upon much that is interesting in the habits and customs of a people that formerly ruled the greatest portion of India. I have, however, lately been informed that Dr. Haug of Poona has succeeded in obtaining possession of a number of Jain books in the Pali character, and that he intends to use them in illustration of the Jain literature and history.

"6. If considered necessary, I will furnish photographs of some of the most remarkable of the Himarpanti temples, giving views of their interiors as well as of their elevation. The most ancient are sunk three or four feet below the level of the surrounding ground, and are so covered in as to be barely perceptible to those ignorant of their locality."

The Council submitted for the approval of the Society, the following report from the Philological Committee, which had been adopted by them:—

REPORT.

The Philological Committee recommend to the Council that the following offers to edit works in the *Bibliotheca Indica* be accepted:—

1. From Pundit Jayanáráyana Tarkapanchánana, Professor of Philosophy in the Sanscrit College, to edit the *Nyáya Bháshya* of Vátsyáyana.

This is a very rare work. Three MSS. are available for the text. It is the earliest commentary on the Nyáya aphorisms, and is of the utmost importance for ascertaining the doctrines of the ancient as opposed to the modern Naiyáyika school. It will occupy about two Fasciculi.

2. From Dr. Mason of Tounghoo, to print a Pali Grammar prepared by him from a Native Grammar found in a Burmese monastery. Mr. Grote and Dr. Sprenger formerly reported favourably upon the MSS. Dr. Mason proposes printing the Grammar at the "Tounghoo Karen Institute Press," and requests that he may have 100 copies.

3. From Pundit Rámnáráyana, to edit the Sutras of Asvaláyana with the Vritti. This is the authority for the sacrificial ceremonies of the Hotris or Priests connected with the Rig Veda. It will occupy about six Fasciculi.

4. From Captain Lees, to superintend the editing by a Moulavy of the poem of Ramyn and Wais. The Philological Committee refer for an account of this most rare and valuable ancient Persian poem (translated from the Pehlevi) to the letter from Dr. Sprenger in the Journal No. II. for 1863. Only one MS. is known to be extant, and it is of great importance that a poem possessing so many claims to our notice should be preserved by printing from the many accidents incidental to MSS. in such a climate as Bengal.

Communications were received—

1. From Lieut.-Colonel R. C. Tytler, "Observations on keeping salt-water fish alive for a considerable time."

2. From H. F. Blanford, Esq., A note on the late hail-storm in Calcutta.

3. From Colonel J. C. Brooke, through Captain W. N. Lees, A paper descriptive of "The Mines of Khetree in Rajpootana."

4. From Captain H. G. Raverty, "The Pushto or Afghan Language from an American Point of View."

5. From Dr. A. Wise, F. R. S., A paper entitled "Peculiarities and Uses of the Pillar Towers of the British Islands."

6. From J. E. T. Aitchison, Esq., M. D., F. R. C. S., F. L. S. E., "Remarks on the Vegetation of the Islands of the Indus River."

7. From Baboo Gopeenauth Sen, An Abstract of the Hourly Meteorological Observations taken at the Surveyor General's Office in January last.

8. From the Under-Secretary to the Government of India, Public Works Department, Copies of Major-General Cunningham's Diaries of Occupations as Archæological Surveyor for the months of November and December, 1863, and January, 1864.

The Hon'ble the Lieutenant-Governor then read to the meeting portions of letters received from the Hon'ble Ashley Eden, giving an account of the principal incidents of his journey to the capital of Bhotan. Colonel Thuillier also exhibited maps of the route compiled from information received from Captain H. Godwin Austen, Topographer to the Bhotan Expedition; and offered some remarks in explanation of the circumstances under which the data for these maps had been obtained.

The thanks of the meeting were voted to the Hon'ble the Lieut.-Governor and Colonel Thuillier for the above interesting communications.

Colonel Tytler's and Mr. Blanford's papers were then read to the meeting, and in the discussion which ensued on the latter paper, some observations of interest were made by Dr. Brandis and the Hon'ble Mr. Beadon, which were recorded for publication with the original paper.

FOR MAY, 1864.

Lieut.-Col. J. E. Gastrell, in the chair.

The proceedings of the last Meeting were read and confirmed.

Presentations were received—

1. From Col. H. L. Thuillier, a copy of the Instructions for taking Meteorological Observations with tables, By Sir H. James, R. E.

2. From Kongl. Norske Frederiks Universitets Secretariat, several works published by the University, and other Norwegian works.

3. From Professor C. A. Holmboe, 4 pamphlets.

4. From Syud Keramat Ali, Hooghly, a copy of his work entitled Byan Makhza 'Alúm.

5. From the Hon'ble L. S. Jackson, a copy of an Inscription on a brick-built mosque at Bagha, in Rajshahye.

6. From W. S. Atkinson, Esq., specimens of *Streptaulus Blanfordi* and *Clausilia Iös* from Darjeeling.

7. From Lieutenant-Colonel R. C. Tytler, a collection of fishes, mammalia and minerals.

8. From the same, through A. Grote, Esq., specimens of Andamanese Geckos, in spirit.

9. From the Hon'ble Ashley Eden, a collection of bird skins and a Pteromys, collected during the Bhotan expedition.

Letters from R. H. Wilson, Esq., F. L. Beaufort, Esq.* and the Hon'ble E. P. Levinge, intimating their desire to withdraw from the Society were recorded.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members:

Dr. R. Bird, Civil Surgeon, Howrah: Dr. J. B. Barry; N. S. Alexander, Esq., C. S.; G. W. Cline, Esq. and Baboo Ramá Nath Bose.

* Announced in error. See Proc. for June.

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The following gentlemen were named for ballot as ordinary members at the next meeting :—

Brigadier-General H. G. D. Showers,—proposed by Mr. Grote seconded by Colonel Thuillier.

R. E. Goolden, Esq.,—proposed by Dr. Partridge, seconded by Mr. Blanford.

J. O.' B. Saunders, Esq.,—proposed by Captain W. N. Lees, seconded by Mr. Blanford.

Moulvi Moula Bukhsh Khan Bahadoor of Patna,—proposed by Moulvi Abdool Luteef Khan Bahadoor, seconded by Mr. Blanford.

Baboo Jadu Nath Mookerjee, of Rajshahye,—proposed by Mr. Heeley, seconded by Mr. H. F. Blanford.

As a corresponding member, E. Blyth, Esq., Associate Member of the Society,—proposed by Dr. Jerdon.

A discussion arose on this nomination, Mr. Blyth being already an Associate Member of the Society, and it appearing doubtful, whether any additional distinction would be conferred, by his election as a corresponding member ; it was, therefore, proposed by Dr. Brandis, that as Mr. Blyth is now an Associate Member of the Society, the nomination be referred to the Council for a report ; which proposition being put to the vote was adopted by the meeting.

The Council reported that they had elected Colonel H. L. Thuillier and H. Scott Smith, Esq., as members of the Council, in place of Messrs. Cowell, and H. Leonard, who had left for Europe.

Communications were received—

1. From Reverend M. A. Sherrings, L. L. B., and C. Horne, Esq. C. S., a paper entitled "Description of the Buddhist Ruins at Bakariya Kund, Benares," with illustrations of plans and photographs.

2. From the Under-Secretary to the Government of India, Public Works Department, a copy of a report on the proceedings of the Archæological Surveyor to the Government of India, for 1862-63.

3. From Baboo Gopeenauth Sen, an abstract of the Hourly Meteorological Observations taken at the Surveyor General's office in February last.

The paper of Colonel Brooke on the mines of Khetree, in Rajpootana, and that of the Reverend M. A. Sherrings, L. L. B., and C. Horne, Esq. C. S., describing the Buddhist ruins at Bakariya Kund, Benares, were read.

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Meteorological Observations.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Feet.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.969	30.051	29.903	0 148	65.8	76.2	57.0	19.2
2	.965	.030	.912	.118	67.2	76.4	59.8	16.6
3	*Sunday.*							
4	30.033	.130	.969	.161	65.1	74.4	56.4	18.0
5	.001	.066	.948	.118	65.5	75.8	57.2	18.6
6	.021	.093	.967	.126	65.8	75.0	58.4	16.6
7	.068	.154	30.018	.136	64.2	73.6	56.4	17.2
8	.076	.157	.020	.137	63.2	73.0	55.0	18.0
9	.089	.177	.027	.150	64.3	75.0	55.6	19.4
10	*Sunday.*							
11	.033	.111	29.965	.146	65.6	77.4	57.4	20.0
12	.038	.123	.991	.132	66.9	77.0	58.6	18.4
13	.044	.129	.992	.137	65.5	76.4	56.0	20.4
14	29.995	.090	.923	.167	64.8	74.8	56.0	18 8
15	.954	.042	.876	.166	65.7	76.7	56.0	20.7
16	.884	29.933	.836	.097	65.3	71.9	58.0	13.9
17	*Sunday.*							
18	.943	30.025	.883	.142	64.5	73.2	56.4	16.8
19	.951	.040	.894	.146	65 1	74.7	56.6	18.1
20	.974	.051	.922	.129	64.8	75.9	55.0	20.9
21	30.002	.087	.945	.142	64.3	74.8	55.4	19.4
22	29.969	.059	.912	.147	65.8	77.3	54.8	22.5
23	.898	29.980	.828	.152	69.7	82.2	59.6	22.6
24	*Sunday.*							
25	.979	30.051	.930	.121	62.4	73.1	52.8	20.3
26	.990	.070	.935	.135	62.8	74.0	52.8	21.2
27	.967	.039	.924	.115	64.0	76.2	54.0	23.2
28	.960	.023	.917	.106	64.5	75.8	56.0	19.8
29	30.000	.080	959	.121	64.7	76.2	55.4	20.8
30	.000	.086	.933	.153	63.3	74.7	54.2	20.5
31	*Sunday.*							

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	60.0	5.8	55.4	10.4	0.449	4.98	2.06	0.71
2	61.7	5.5	57.3	9.9	.478	5.28	.07	.72
3	*Sunday.*							
4	58.1	7.0	52.5	12.6	.407	4.52	.37	.66
5	59.0	6.5	53.8	11.7	.425	.71	.27	.68
6	58.4	7.4	52.5	13.3	.407	.52	.52	.64
7	57.5	6.7	51.5	12.7	.393	.37	.32	.65
8	56.4	6.8	50.3	12.9	.377	.21	.28	.65
9	57.1	7.2	50.6	13.7	.381	.24	.48	.63
10	*Sunday.*							
11	59.2	6.4	54.1	11.5	.429	.76	.24	.68
12	59.8	7.1	54.1	12.8	.429	.75	.53	.65
13	59 0	6.5	53.8	11.7	.425	.71	.27	.68
14	58.8	6.0	54.0	10.8	.428	.75	.08	.70
15	59.7	6.0	54.9	10.8	.441	.89	.13	.70
16	60.5	4.8	56.7	8.6	.469	5.19	1.74	.75
17	*Sunday.*							
18	58.7	5.8	54.1	10.4	.429	4.78	.98	.71
19	58.2	6.9	52.7	12.4	.409	.56	2.33	.66
20	57.6	7.2	51.8	13.0	.397	.41	.42	.65
21	57.1	7.2	50.6	13.7	.381	.24	.48	.63
22	58.6	7.2	52.8	13.0	.411	.56	.48	.65
23	62.6	7.1	56.9	12.8	.472	5.18	.75	.65
24	*Sunday.*							
25	53.7	8.7	45.9	16.5	.324	3.62	.71	.57
26	54.1	8.7	46 3	16.5	.329	.67	.74	.57
27	55.7	8.3	48.2	15.8	.351	.91	.74	.59
28	56.8	7.7	50.6	13.9	.381	4.24	.52	.63
29	55.4	9.3	48.0	16.7	.349	3.87	.93	.57
30	5[illegible].3	8.0	48.1	15.2	.350	.90	.61	.60
31	*Sunday.*							

All the Hygrometrical elements are computed by the Greenwich Constants.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month,			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	30.003	30.096	29.933	0.163	60.5	63.4	57.0	6.4
1	29.989	.090	.895	.195	59.9	62 8	56.2	6.6
2	.981	.090	.874	.216	59.3	62.6	55.2	7.4
3	.972	.081	.869	.212	58.6	62.4	54.8	7.6
4	.967	.073	.862	.211	57.9	62.3	54.2	8.1
5	.982	.080	.859	.221	57.0	61.0	53.4	7.6
6	.992	.090	.877	.213	56.9	60.2	53.2	7.0
7	30.013	.114	.900	.214	56.2	59.8	52.8	7.0
8	.041	.160	.908	.252	60.2	64.0	56.8	7.2
9	.063	.177	.909	.268	63.2	65.6	60.0	5.6
10	.071	.174	.933	.241	66.6	70.8	64.0	6.8
11	.053	.153	.912	.241	69.5	74.9	66.0	8.9
Noon.	.022	.117	.901	.216	72.2	78.0	69.4	8.6
1	29 989	.070	.869	.201	73.9	80.2	71.4	8.8
2	.963	.046	.846	.200	75.1	82.2	71.0	11.2
3	.944	.038	.836	.202	75.3	82.1	71.6	10.5
4	.937	.027	.828	.199	73.9	80.0	70.8	9.2
5	.941	.032	.836	.196	71.8	77.6	67.2	10.4
6	.949	.038	.837	.201	68.9	73.6	65.6	8.0
7	.968	.068	.848	.220	66.5	70.4	62.8	7.6
8	.985	.095	865	.230	64.9	68.2	61.6	6.6
9	30.001	.110	.921	.189	63.5	66.6	60.0	6.6
10	.000	.118	.875	.243	62.7	67.6	58.8	8.8
11	29.995	.084	.871	.213	61.7	67.2	57.0	10.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Midnight.	56.3	4.2	52.5	8.0	0.407	4.57	1.40	0.77
1	56.1	3 8	52.7	7.2	.409	.60	.25	.79
2	55.6	3.7	52.3	7.0	.404	.55	.19	.79
3	55.2	3.4	52.1	6.5	.401	.52	.10	.80
4	54.7	3.2	51.8	6.1	.397	.48	.01	.82
5	54.0	3.0	51.3	5.7	.390	.41	0.93	.83
6	53.9	3.0	51.2	5.7	.389	.40	.92	.83
7	53.2	3.0	50.2	6.0	.376	.26	.95	.82
8	55.2	5.0	50.7	9.5	.382	.29	1.62	.73
9	56.7	6.5	50.8	12.4	.383	.28	2.21	.66
10	58.2	8.4	51.5	15 1	.393	.36	.85	.61
11	59.4	10.1	51.3	18.2	.390	.30	3.58	.55
Noon.	60.4	11.8	51.0	21 2	.386	.23	4.32	.50
1	60.9	13.0	51.8	22.1	.397	.33	.68	.48
2	61.6	13.5	52.1	23.0	.401	.37	.97	.47
3	61.6	13.7	52 0	23.3	.400	.35	5.05	.46
4	61.0	12.9	52.0	21.9	.400	.36	4.65	.48
5	61.3	10.5	52.9	18.9	.412	.52	3.93	.54
6	61.3	7.6	55.2	13.7	.445	.91	2.83	.63
7	60.5	6.0	55.7	10.8	.453	5.02	.17	.70
8	59.6	5.3	55.4	9.5	.449	4.98	1.87	.73
9	58.6	4.9	54.2	9.3	.431	.80	.75	.73
10	58.1	4.6	54.0	8.7	.428	.77	.62	.75
11	57.5	4.2	53.7	8.0	.423	.74	.45	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. P. of W.	General Aspect of the Sky.
	°	Inches.		lbs	
1	132.4	...	N.	¼	Cloudless; also slightly foggy from 2 to 5 A. M.
2	129.7	...	N. & N. W.	¼	Scatd. clouds till 1 P. M.; cloudless afterwards.
3	...	...	*Sunday.*	¼	
4	146.8	...	N. & N. W.	½	Cloudless.
5	137.4	...	N. & N. W.	½	Cloudless till 5 A. M.; Scatd. ⌇i till Noon; cloudless afterwards.
6	127.5	...	N. W. & N.	¾	Cloudless.
7	136.0	...	N. & N. W.	½	Cloudless.
8	131.8	...	N. W. & N.	¼	Cloudless.
9	133.2	...	N.	¾	Cloudless.
10	...	...	*Sunday.*	½	
11	130.0	...	N.	½	Cloudless. [P. M.
12	133.8	...	N.	½	Cloudless; also foggy between 8 & 11
13	136.0	...	N.	¼	Cloudless.
14	128.0	...	N.	¼	Cloudless till 1 P. M.; Scatd. clouds till 8 P. M.; cloudless afterwards also slightly foggy at 11 P. M.
15	131.2	...	S. E. & N.	¼	Cloudless.
16	124.0	...	N. & S.	¼	Cloudless till 1 P. M.; Scatd. clouds till 5 P. M.; cloudless afterwards.
17	...	...	*Sunday.*	½	
18	131.2	...	N. & W.	1¼	Cloudless till 1 P. M.; Scatd. ⌒i & ⌣i till 6 P. M.; cloudless afterwards, also slightly foggy from 9 to 11 P. M.
19	132.0	...	N. W. & W.	½	Cloudless.
20	137.5	...	W. & N. W.	¼	Cloudless; also foggy from 8 to 11 P. M.
21	134.6	...	N. W. & W.	½	Cloudless; also slightly foggy from 8 to 11 P. M.
22	136 0	...	N. W. & S. & S. W.	½	Cloudless.
23	142.8	...	S.	¼	Cloudless; also slightly foggy between 3 & 7 A. M.
24	...	...	*Sunday.*	¾	
25	136.0	...	W. & N.	¼	Cloudless; also foggy at 8 P. M.
26	132.0	...	W. & N. W. & N.	¼	Cloudless.
27	136.0	...	N. & S.	¼	Cloudless.
28	133.0	...	N. & W. & S.	1½	Cloudless, also foggy at 5 A. M. and between 9 & 11 P. M.
29	137.0	...	W. & N.	¼	Cloudless.
30	131.0	...	N. & W.	½	Cloudless.
31	...	...	*Sunday.*	¼	

⌇i Cirri, ⌣i Cirro strati, ⌒i Cumuli, ⌒i Cumulo strati, ⌇i Nimbi, —i Strati, ⌇i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.992
Max. height of the Barometer occurred at 9 A. M. on the 9th, ..	30.177
Min. height of the Barometer occurred at 4 P. M. on the 23rd, ..	29.828
Extreme range of the Barometer during the month, ...	0.349
Mean of the daily Max. Pressures, ...	30.072
Ditto ditto Min. ditto, ...	29.936
Mean daily range of the Barometer during the month, ...	0.136

	°
Mean Dry Bulb Thermometer for the month, ...	65.0
Max. Temperature occurred at 2 P. M. on the 23rd, ...	82.2
Min. Temperature occurred at 7 A. M. on the 25th & 26th, ..	52.8
Extreme range of the Temperature during the month, ...	29.4
Mean of the daily Max. Temperature, ...	75.5
Ditto ditto Min. ditto, ...	56.2
Mean daily range of the Temperature during the month, ..	19.3

	°
Mean Wet Bulb Thermometer for the month, ...	58.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer,..	7.0
Computed Mean Dew-point for the month, ...	52.4
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	12.6
	Inches
Mean Elastic force of Vapour for the month,..	0.405

	Troy grains
Mean Weight of Vapour for the month, ...	4.50
Additional Weight of Vapour required for complete saturation, ..	2.37
Mean degree of humidity for the month, complete saturation being unity,	0.66

	Inches
Rained no days, Max. fall of rain during 24 hours, ...	Nil.
Total amount of rain during the month, ...	Nil.
Prevailing direction of the Wind, ...	N. & N. W. & W.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1864.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on	Missed.
	No. of days.																		
Midnight.	14								3				3		2				4
1	15						1		2				5		3				
2	14						1		2				5		4				
3	14						1		2				4		4				1
4	14						1		2				3		5				1
5	14								1				5		2				4
6	12								2		2		5		1				4
7	15								3		2		5		1				
8	15		1						2		3		3		1				1
9	14		3		1				3		1		2		2				
10	11		3		2				2		2		4		2				
11	11		2		2		1		2		1		5		2				
Noon.	10		1		2		1						8		4				
1	6		1		1				1		2		4		11				
2	7								1		2		8		8				
3	7						1		1		2		4		11				
4	10						1		1				4		10				
5	9						1		2				5		9				
6	11						1		3				4		7				
7	11						1		3				5		6				
8	11						1		3				5		6				
9	11						1		2				5		6				1
10	9						1		3				5		7				1
11	10						1		3				5		6				1

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	30.074	30.155	30.015	0.140	68.0	78.4	58.8	19.6
2	.111	.183	.060	.123	69.8	78.4	63 6	14.8
3	.120	.193	.055	.138	71.8	80.8	64 8	16.0
4	.132	.213	.072	.141	71.8	81.2	65.2	16.0
5	.136	.234	.057	.177	68.3	79.2	58.8	20.4
6	.108	.190	.027	.163	68.2	80.4	57.8	22.6
7	*Sunday.*							
8	.034	.121	29.967	.154	71.7	82.5	64.0	18.5
9	.029	.119	.969	.150	73.5	83.4	66 0	17.4
10	.014	.085	.944	.141	74.0	84.2	67.6	16.6
11	29.996	.062	.931	.131	74.6	85.6	66.3	19.3
12	30.015	.082	.966	.116	74.7	85.1	67.4	17.7
13	29.958	.048	.881	.167	75.6	87.8	68.4	19.4
14	*Sunday.*							
15	.822	29.899	.768	.131	76.0	85.2	68.6	16.6
16	.775	.852	.696	.156	75.7	83.2	69.6	13.6
17	.734	.798	.622	.176	76.0	82.4	69.6	12.8
18	.847	.927	.792	.135	65.5	72.2	61.2	11.0
19	.839	.898	.779	.119	67.2	77.2	57.6	19.6
20	.867	.940	.811	.129	70.9	80.6	62.6	18.0
21	*Sunday.*							
22	.965	30.037	.903	.134	71.3	80.6	62.2	18.4
23	.868	29.953	.798	.155	74.3	82.2	68.6	13.6
24	.799	.879	.713	.166	76.0	84.2	69 5	14.7
25	.791	.884	.734	.150	74.1	81.8	67.6	14.2
26	.824	.911	.770	.141	74.5	83.8	65.6	18.2
27	.806	.893	.745	.148	75.5	84.2	69.2	15.0
28	*Sunday.*							
29	.821	.900	.752	.148	78.4	87.2	70.6	16.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	63.6	4.4	60.1	7.9	0.525	5.80	1.73	0.77
2	65.8	4.0	62.6	7.2	.570	6.28	.67	.79
3	66.9	4.9	63.0	8.8	.578	.33	2.12	.75
4	64.8	7.0	59.2	12.6	.509	5.58	.87	.66
5	60.0	8.3	53.4	14.9	.419	4.63	.97	.61
6	59.9	8.3	53.3	14.9	.418	.62	.96	.61
7	*Sunday.*							
8	65.2	6.5	60.0	11.7	.523	5.73	.70	.68
9	67.1	6.4	62.6	10.9	.570	6.23	.67	.70
10	68.1	5.9	64.0	10.0	.597	.52	.52	.72
11	68.0	6.6	63.4	11.2	.586	.39	.81	.70
12	67.6	7.1	62.6	12.1	.570	.22	3.01	.67
13	69.2	6.4	64.7	10.9	.611	.65	2.83	.70
14	*Sunday.*							
15	69.3	6.7	64.6	11.4	.609	.63	.97	.69
16	70.3	5.4	66.5	9.2	.648	7.06	.45	.74
17	70.5	5.5	66.6	9.4	.651	.08	.52	.74
18	57.3	8.2	50.7	14.8	.382	4.25	.73	.61
19	59.8	7.4	53.9	13.3	.426	.72	.63	.64
20	63.1	7.8	56.9	14.0	.472	5.17	3.06	.63
21	*Sunday.*							
22	64.2	7.1	58.5	12.8	.498	.45	2.88	.65
23	68.9	5.4	65.1	9.2	.619	6.77	.35	.74
24	69.9	6.1	65.6	10.4	.630	.86	.74	.72
25	65.4	8.7	59.3	14.8	.511	5.57	3.50	.61
26	63.8	10.7	56.3	18.2	.462	.04	4.14	.55
27	65.1	10.4	57.8	17.7	.486	.28	.18	.56
28	*Sunday.*							
29	71.2	7.2	66.2	12.2	.642	6.95	3.36	.67

All the Hygrometrical elements are computed by the Greenwich Constants.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.941	30.147	29.760	0.387	68.9	76.0	61.8	14.2
1	.937	.138	.747	.391	68.2	75.7	60.8	14.9
2	.935	.132	.747	.385	67.6	75.0	60.0	15.0
3	.925	.127	.728	.399	67.2	74.6	59.5	15.1
4	.896	.102	.718	.384	67.3	74.0	59.0	15.0
5	.920	.127	.729	.398	66.1	73.4	58.5	14.9
6	.944	.148	.757	.391	65.7	73.6	57.6	16.0
7	.962	.177	.765	.412	65.5	73.6	57.6	16.0
8	.991	.209	.785	.424	67.4	74.6	61.2	13.4
9	30.008	.228	.798	.430	70.4	76.5	62.0	14.5
10	.018	.234	.798	.436	72.9	78.9	63.2	15.7
11	.003	.212	.778	.434	75.6	80.6	65.0	15.6
Noon.	29.974	.184	.742	.442	78.4	83.2	69.0	14.2
1	.941	.138	.716	.422	80.3	85.9	71.2	14.7
2	.911	.104	.676	.428	81.4	87.0	71.2	15.8
3	.889	.082	.631	.451	81.8	87.8	71.4	16.4
4	.882	.072	.622	.450	81.2	86.8	72.2	14.6
5	.882	.078	.635	.443	79.4	86.4	70.0	16.4
6	.888	.083	.645	.438	76.8	83.6	67.6	16.0
7	.907	.104	.691	.413	74.6	81.0	66.0	15.0
8	.926	.135	.746	.389	72.9	79.6	64.4	15.2
9	.943	.144	.760	.384	71.5	78.0	63.0	15.0
10	.950	.153	.773	.380	70.7	77.4	62.6	14.8
11	.949	.159	.766	.393	69.9	77.2	62.2	15.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	64.7	4.2	61.3	7.6	0.546	6.02	1.72	0.78
1	64.3	3.9	61 2	7.0	.544	.01	.57	.79
2	64.1	3.5	61.3	6.3	.546	.05	.39	.81
3	64.0	3.2	61.4	5.8	.548	.07	.28	.83
4	64.3	3.0	61.9	5.4	.557	.17	.20	.84
5	63.2	2.9	60 9	5.2	.539	5.98	.12	.84
6	62.9	2.8	60.7	5.0	.536	.94	.08	.85
7	62.6	2.9	60.3	5.2	.528	.87	.11	.84
8	63.3	4.1	60.0.	7.4	.523	.79	.60	.78
9	64.6	5.8	60.0	10.4	.523	.75	2.35	.71
10	65.4	7.5	59.4	13.5	.513	.60	3.13	.64
11	66.5	9.1	60.1	15.5	.525	.70	.78	.60
Noon.	67.5	10.9	59.9	18.5	.521	.63	4.68	.55
1	68.0	12.3	59.4	20.9	.513	.52	5.39	.51
2	68.3	13.1	59.1	22.3	.508	.46	.81	.48
3	68.5	13.3	59.2	22.6	.509	.47	.93	.48
4	68.2	13.0	59.1	22.1	.508	.46	.75	.49
5	68.2	11.2	60.4	19.0	.530	.72	4.90	.54
6	68.2	8.6	62.2	14.6	.563	6.10	3.73	.62
7	67.5	7.1	62.5	12.1	.568	.20	.00	.67
8	66.7	6.2	61 7	11.2	.554	.05	2.68	.69
9	66.2	5.3	62.0	9.5	.559	.13	.25	.73
10	65.8	4.9	61.9	8.8	.557	.12	.06	.75
11	65.5	4.4	62.0	7.9	.559	.15	1.83	.77

All the Hygrometrical elements are computed by the Greenwich Constants.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
1	127.3	...	W. & S.	¼	Cloudless till 5 A. M. Scatd. clouds till 5 P. M. cloudless afterwards also foggy from 5 to 10 A. M.
2	133.0	...	S. W. & W.	¼	Cloudless till 7 A. M. cloudy till 11 A. M., cloudless afterwards also slightly foggy at 10 & 11 A. M.
3	133.6	...	S. & S. W. & W.	¼	Cloudless till 3 A. M. Scatd. clouds till 7 P. M., cloudless afterwards also slightly drizzling at 7 P. M.
4	134.0	...	N. & N. W.	...	Scatd. clouds till 8 A. M., cloudless afterwards.
5	135.6	...	N. & S. W.	¼	Cloudless.
6	138.0	...	N. & S. & W.	½	Cloudless.
7	...	...	*Sunday.*	¾	
8	137.8	...	S. W. & S.	¼	Cloudless till 4 A. M., cloudy & foggy till 7 A. M. cloudless afterwards.
9	138.8	...	S. & W.	...	Cloudless; also foggy from 3 to 7 A. M.
10	139.8	...	S. & W.	...	Cloudless; also foggy from 5 to 7 A. M.
11	144.0	...	S. W. & S.	¼	Cloudless; also foggy from 1 to 7 A. M.
12	141.2	...	S.	½	Cloudless till 2 A. M. cloudy & foggy till 8 A. M., cloudless afterwards.
13	140.3	...	S. & S. W.	1	Cloudless; also slightly foggy between 2 & 4 A. M.
14	...	...	*Sunday.*	1	
15	135.8	...	S.	½	Cloudless.
16	133.0	...	S.	4¾	Scatd. ⌣i till 4 A. M., cloudless till 4 P. M. Scatd. clouds afterwards.
17	124.0	0.38	S. & N.	13¾	Scatd. clouds till 4 P. M., cloudy afterwards; also raining at 3 A. M. & at 8 P. M.
18	...	...	N. & N. W.	2	Scatd. \i & ⌣i till 5 A. M., cloudy till 6 P. M., cloudless afterwards.
19	133.0	...	N. E. & S.	½	Cloudless till 1 P. M. Scatd. ⌣i afterwards.
20	134.0	...	E. & N. E. & S. E.	¼	Scatd. \⌒i till 6 A. M. Scatd. ⌣i afterwards.
21	...	...	*Sunday.*	1¾	
22	134.0	...	N. & N. E. & N. W.	¼	Scatd. ⌣i till 1 P. M., cloudy afterwards; also slightly drizzling at 10 P. M
23	131.0	...	Variable.	¼	Cloudy till 11 A. M.; Scatd. ⌒i till 5 P. M. cloudless afterwards; also slightly drizzling at 1 A. M.

\i Cirri, ⌣i Cirro strati, ⌒i Cumuli, ⌒~i Cumulo strati, ⌣~i Nimbi, —i Strati ⌣ i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
24	140.0	0.09	W. & S.	13½	Cloudy till 7 A. M., cloudless till 1 P. M., cloudy afterwards, also foggy from 5 to 8 A. M. and raining and lightning at 8 P. M.
25	132.0	...	S. & W.	1	Cloudy till 2 A. M.; cloudless afterwards.
26	138.9	...	N. W. & S. & W.	1¼	Cloudless.
27	139.0	...	N. & S. & W.	¼	Cloudy till 7 A. M.; cloudless afterwards.
28	...	...	*Sunday.*	¼	
29	141.3	...	S	½	Cloudless till 4 A. M. Scatd. clouds till 2 P. M.; Scatd. Ci till 7 P. M. cloudless afterwards.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.939
Max. height of the Barometer occurred at 10 A. M. on the 5th, ..	30.234
Min. height of the Barometer occurred at 4 P. M. on the 17th, ..	29.622
Extreme range of the Barometer during the month, ...	0.612
Mean of the Daily Max. Pressures, ...	30.018
Ditto ditto Min. ditto, ...	29.873
Mean daily range of the Barometer during the month, ...	0.145

	°
Mean Dry Bulb Thermometer for the month, ...	72.7
Max. Temperature occurred at 3 P. M. on the 13th, ...	87.8
Min. Temperature occurred at 6 & 7 A. M. on the 19th, ...	57.6
Extreme range of the Temperature during the month, ...	30.2
Mean of the daily Max. Temperature, ...	82.1
Ditto ditto Min. ditto, ...	65.2
Mean daily range of the Temperature during the month, ...	16.9

	Inches
Mean Wet Bulb Thermometer for the month, ...	65.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	6.9
Computed Mean Dew-point for the month, ...	60.3
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	12.4
Mean Elastic force of Vapour for the month, ...	0.528

	Troy grains
Mean Weight of Vapour for the month, ...	5.79
Additional Weight of Vapour required for complete saturation, ..	2.89
Mean degree of humidity for the month, complete saturation being unity,	0.67

	Inches
Rained 5 days, Max. fall of rain during 24 hours, ...	0.38
Total amount of rain during the month, ...	0.47
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	0.35
Prevailing direction of the Wind, ...	S. & W.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of March, 1864.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	1								13		5		3		2				3
1	1								15		6		3	1	2				
2	1								14		7	1	3	1	1				1
3	3								14		6		2		2				
4	4						1		12		7				1				2
5	3						1		12		5		3		2				1
6	4						1		10		6		3		3				
7	3				1		1		9		9		1		3				
8	4		1		1		1		9		7		2		2				
9	5				2				7		9		2		2				
10	4				1				9		7		4		2				
11	4						1		5		4		8		5				
Noon.	4				1		3		5		7		5		2				
1	3						1		6		7		6		4				
2	3								7		3		9		5				
3	4								7		2		12		2				
4	2				1		1		4		3		10		5				1
5	1						1	1	6		7		7		5				
6	1				1		2	1	8		5		4		5		1		
7	2				1		2		9		4		3	1	5		1		
8	1				1		4		9	1	4		3		5				
9	1				1		3		12	1	4		2		4				
10	1				1		3	1	11		5		2		4				
11	1				1		3	1	9		4		2		4		1		2

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*Remarks on the date of the Pehewa Inscription of Raja Bhoja.**—*By Major-General* A. CUNNINGHAM.

The age of the Pehewa Inscription of Raja Bhoja has been a subject of difference between Babu Rajendra Lal and myself, for some years past. When he first published the inscription in 1853 (J. A. S. Bengal, p. 674) he read the date as 179 Samvat, to which I demurred at the time. He again referred to the subject in 1858, (J. A. S. Bengal, p. 76) and his remarks lead me to believe that at that time he still adhered to his original reading. But in an article just now published, he has finally come round to my view of the subject by candidly admitting that the forms of the alphabetical characters may be "a good test to some extent," and that we are fully justified in placing the date of the Pehewa Inscription in the 9th, 10th, or 11th century, (see J. A. S. Bengal, 1863, pp. 100, 101).

With this happy conclusion I should have been contented to let the matter drop; but as, during the discussion, several erroneous statements have been put forth by the Babu, some of which affect me personally, I think it right, in justice to myself, to correct these errors at once, lest others should be misled by the Babu's authority to believe that they are actually my opinions.

When the Babu first published his translation of the Pehewa Inscription, I objected to his placing Col. Tod's first Bhoja in the year 179 *Samvat* according to his reading of the Pehewa inscription. When I made this objection I knew nothing more of this inscription than what Rajendra had himself published. But as I knew that two

* For Bábu Rájendralála Mitra's reply to these Remarks vide the Proceedings of the Society for September last (Ante, vol. XXXII. p. 437.)—Eds.

Bhojas had flourished at much later periods, namely in A. D. 876 and A. D. 1030, I thought it quite possible that there might have been some omission in the figured date, and that the true reading might perhaps be 1079, instead of 179. Rajendra now states that the actual date is 279, and that the reading of 179 was a misprint in his paper in *one place* (see J. A. S. B. 1863, p. 98.) But on this point I must refer the Babu to his previous article, where he will find that the number 179 is given twice directly, and twice indirectly, or altogether in no less than *four* places. As in the two latter instances this number is obtained by subtraction, I think that the Babu must have altogether forgotten the remarks which accompanied his translation. At p. 674, J. A. S. Bengal, 1853, he gives the date of the inscription as "S. 179 = A. C. 122." Now if S. 179 be a misprint, even so must the equivalent date of A. C. 122 be a misprint. And similarly the Babu's remark that "the first Bhoja lived about three and a half centuries before the time assigned him by the learned historian of the Rajputs" must contain another mistake in the number *three*, which is written at full length. For the date of Col. Tod's first Bhoja is the end of the fifth century (or 483 A. C. as quoted by the Babu in this very paper) from which deducting 350 years we obtain A. D. 133, which is within *eleven* years of A. D. 122, (the equivalent of Samvat 179) but which differs no less than *eighty-nine* years from A. D. 222, the equivalent of Samvat 279. There can be little doubt therefore that when the Babu obtained the date of A. D. 122, and also when he wrote at full length the words "three and a half centuries" he must himself have read the date as 179. The number 279 occurs *once* only in this paper, and that is in the Devanâgari transcript.

A long time after I had made the above objection Mr. Grote kindly sent me a pencil tracing of the date made by Rajendra himself, together with the words *Samvat* and *Vaisâkh Sudi*. On seeing the few letters of these words I wrote to Mr. Grote, as printed in the Bengal As. Soc. Journal, that the inscription was beyond all doubt a middle age one, because the forms of the letters were those of the 11th and 12th centuries, to which I added that I read the date as S. 1190 or A. D. 1133.

Babu Rajendra now writes that Mr. E. Thomas entirely concurred in this reading, and that Professor Weber had also adopted it, but, adds the Babu "none of my critics thought it worth his while to look

to the genealogy of the prince named." He then goes on to say that "it may appear strange that Col. Cunningham and Professor Weber should, from a mere identity of names, infer the identity of persons, and yet both of them found the name of a Bhoja in the monument under notice, and *per saltum* came to the conclusion that it was that of Dhâra, overlooking," &c. As the most complete refutation of this strange statement, I need simply refer the reader to the difference of one whole century between the date of A. D. 1133, as suggested by me, and that of A. D. 1030, the well-ascertained period of Raja Bhoja of Dhâra.

In my proposed reading of the date I assumed that a single cypher had been unintentionally omitted. But this assumption the Babu declares to be "a guess at random which can claim no confidence," although I had most pointedly drawn his attention to a blundered date in one of my Kajraha inscriptions (J. A. S. B. 1860, p. 396), a facsimile of which inscription was with the Babu when he penned the above paragraph about a random guess. I will now further refer him to the Buddha Gaya inscription published by himself in J. A. S. B. Vol. XXVII. p. 74, for an actual omission either of the final letter of the word Samvat, or of the initial cypher of the date. I refer also to this particular inscription on account of the date itself, which has been misread by Rajendra as 781, instead of 981. I grant that, in 1858, before he had seen my Gwalior inscription of S. 933, in which the figured date is accompanied by a written one, it was only natural that he should have read the Buddha Gaya date as 781. But the case is altogether altered when in the present year he still quotes this same inscription as being dated in 781, and makes use of this erroneous date to prove that the Kutila character had a range of at least four centuries, or from Samvat 781 = A. D. 724 to 1124. That this might be true no one, to my knowledge, has ever denied, and it certainly was not likely to have been denied by me when I have had in my possession for many years the following dated inscriptions in slight varieties of the Kutila character.

Inscription from	Baijnâth,	dated	Sáke	726 = 804 A. D.
Ditto	„ Gwalior,	„	Samvat	933 = 876 A. D.
Ditto	„ Kajraha,	„	„	1011 = 954 A. D.
Ditto	„ „	„	„	1058 = 1001 A. D.
Ditto	„ Gwalior,	„	„	1161 = 1104 A. D.

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As in these inscriptions we have a range of exactly three centuries, we may safely extend the range of the use of the Kutila character to at least four centuries, or say from A. D. 750 to 1150. There are of course some differences between the forms of the earlier and later letters, but the general appearance of the writing is essentially the same. But when an inscription in the Kutila character was seriously referred to the year 179 of the Vikramaditya Samvat, or to A. D. 122, I certainly did object, and I do so still.

With regard to the Kutila character I have to point out another misstatement regarding myself which has been made by Babu Rajendra Lal. In the article now under notice on Raja Bhoja of Dhâra (Bengal Journal, 1863, p. 101) the Babu says "the so-called *Kutila*, or the 'crooked' character, which according to Col. Cunningham owes its name to a mislection of the word *Kumuda*, or the 'lotus-like.'" On this subject I beg to refer the Babu to the Society's Journal for 1860, p 394, where he will find that I have made no mention of the word Kutila at all; I simply corrected the word *Kakuda*, or "bad," which was most absurdly applied to the alphabetical character of one of the *Kajrâha* inscriptions, to *Kumuda*, or "beautiful." It is true that I once thought it *possible* that the word *Kuṭila* of the Bareilly inscription might also be, what the Babu calls a "mislection;" but I confined my published opinion to the word *Kakuda*, and kept my thoughts regarding the word *Kuṭila* to myself. Since then I have examined the *Kuṭila* inscription itself, and I find that the word is correctly rendered. *Kuṭila* means "crooked, or bent," and I would refer the epithet to the sloping or bent stroke which is attached to the foot of each letter. Apparently the Babu did not think it "worth his while (I quote his own words, vide p. 98 of Journal for 1863) to look to" the actual statement which I had published in 1860, and, trusting to his memory, has unintentionally made this statement regarding me.

Rajendra Lal has now given a facsimile of the Pehewa inscription, the date of which he says is "unmistakeably Samvat 279." (See p. 97.) But here I must again differ with him, for the middle figure of his facsimile is a 1, and not a 7. The day of the month also has been misread, as the figure of the facsimile is a 1, and not a 7. The first cypher of the date, as now given, looks certainly more like a 2 than any other figure, and the last cypher, according to my reading, is a 6, thus making the whole date 216. This might possibly refer to the

Sri Harsha era of 607 A. D., which would bring the date of the inscription down to A. D. 823. But if the middle figure is actually a 7 (as read by Rajendra, although his facsimile gives a 1) then the date would be 276, or A. D. 883 if referred to the Sri Harsha era, a period which would enable us to identify the Bhoja of the Pehewa inscription with his namesakes of Gwalior in A. D. 876, and of the Raja Tarangini in A D. 883 to 901. I will endeavour to examine the original inscription during the ensuing cold weather, as I have a suspicion that the first figure of the date is not a 2, but either a 1 or a 9. In the pencil tracing sent to me by Mr. Grote the figure is a 1, and so it was read by Rajendra himself, as I have conclusively shown in the opening paragraphs of this paper.

Babu Rajendra has drawn attention to another Raja Bhoja, to whom allusion has been made by Professor Hall in his "Vestiges of the royal lines of Kanoj," with the dates of 960 and 964. To this monument the Babu states that I probably refer (see p. 96 of his article) in my letter published in the Journal for 1860, p. 395. But here again (to use the Babu's own words) he did not think it "worth his while to look to" my actual statement. Had he done so he would have found in J. A. S. B. 1860, p. 395, that I referred to the Gwalior Bhoja Deva inscription with its date of Samvat 933, "both in words and figures." In the same letter I added that "the form of the figure 9 in this date is the same as that which Rajendralal has read as 7," that is, in the Buddha Gaya inscription already quoted. Notwithstanding this direct notice of his misreading of the figure 7, the Babu, in his very last article on Raja Bhoja, has again brought forward this erroneous date of Samvat 721 to prove that the Kutila character was in use as early as that time. I may add that the Babu is equally wrong in his statement that the inscription referred to by Professor Hall, was found "at Gwalior." It is believed to have been found somewhere in the Gwalior territory, but the actual site is not known. It is certain, however, that it was not found "at Gwalior."

In the remarks which accompany his translation of the Bhoja Deva inscription of Gwalior, of which the date, *Samvat* 933, is given both in *words* and in figures, Babu Rajendra (J. A. S. Bengal 1862, p. 399) states that "the date is open to question." "The first figure," he adds, "is peculiarly formed, and may be taken for a 7, which would carry the prince to A. C. 676 = S. 733, or within eleven years of the

second Bhoja of Colonel Tod, with whom he may be taken to be identical." Here then we have the Babu deliberately committing the very error, which he has erroneously attributed to me. It is Rajendra himself who has "hastily jumped to a conclusion regarding the age of a dated inscription from the mere circumstance of the word Bhoja occurring in it."

Hitherto I have spoken only of Rajendra's errors of commission, of which I have to complain, as most of them affect myself personally. I will conclude with noticing his errors of omission, which are equally unfair towards me, and one of which has been the cause of error in others.

In his last article on the Bhojas (J. A. S. Bengal, 1863, p. 97) after mentioning the names of Bhoja Raja of Dhâra, and the Bhoja of the Raja Tarangini, Rajendra says, "The second of these princes I *assume* to have been identical with the sovereign named in an inscription on a Vaishnavite temple at Gwalior. He is described as a lord paramount, who flourished in A. C. 876." In this paragraph the Babu *assumes* the identity without making any reference to my letter, published in this Journal for 1860, p. 395, in which this identification was first made known.

A similar omission of my name occurs in the Babu's latest account of the Rohtas inscription, of which a translation was published in Vol. VIII. of this Journal, p. 695. In my letter, printed in this Journal for 1860, p. 395, I first pointed out that this inscription gave the genealogy of the Tomara Rajas of Gwalior, and that the name of the fourth prince, Dungara, had been misread as Hungara. In his Vestiges of the kings of Gwalior, published only last year, the Babu adopts this identification of the genealogy without acknowledgment and adheres to the name of Hungara in the Rohtas inscription, without mentioning my opinion that it is erroneous.

The last instance of the Babu's omissions, which I shall notice, is a more serious one, namely his adoption of my reading and identification of the *Huvishka* of the Wardak and Mathura inscriptions with the *Hushka* of the Raja Tarangini, without any mention of my name (see his translation of the Wardak inscription in this Journal for 1861, p. 339). My reading of the name of Huvishka in the Wardak inscription, and my identification of this prince with the Huvishka of the Mathura inscriptions, and also with the Hushka of

the Raja Tarangini, will be found in this Journal for 1860, pp. 400, 401. This silent adoption of my identification has enabled Mr. Thomas to ascribe it to Rajendra himself (see Journ. Royal Asiat. Soc. Vol. XX. p. 108; note 2.)*—and Mr. Thomas's authority, added to the Babu's own silence, has induced Professor Dowson to do the same. In the same Vol. of the Royal Asiat. Soc. Journal, Mr. Dowson writes as follows regarding Rajendra's translation of the Wardak inscription,—"Before proceeding to criticise I will perform the more grateful task of applauding the success he has achieved, *especially* in the *reading of the name of the king* and in *identifying* him with the Hushka of the Raja Tarangini. This alone would have been a valuable gain." Here then we see that the two points in the Babu's version of the Wardak inscription, to which Professor Dowson has awarded special praise, are precisely those two which the Babu has adopted from my published letter without any acknowledgment whatever.

Extract from a letter from Major-General CUNNINGHAM.
Dated, Nynee Tâl, 24th May, 1864.

"I have succeeded in clearing up the whole mystery of the date of Raja Bhoja in the Pehoa inscription, which is *written at full length in words*, as well as in figures. The date is 276—Rajendra has misread the name of Bhoja's father, which is *Râmabhadra Deva*, and not *Râmachandra Deva*, as may be seen most distinctly even in his own facsimile. This correction is most important, as it enables us to identify both father and son with two of the Rajas of Kanoj, whose names are given in the Benares copper-plate. To this identification Rajendra will object that the genealogy of the Pehoa inscription prior to Râmabhadra differs entirely from that of the Benares copper-plate; and so it does differ beyond all doubt; but there is no such genealogy in the Pehoa inscription of Raja Bhoja! The explanation of this

* In the same volume, p. 99, in an article read on the 5th July, 1862, Mr. Thomas describes a square copper coin of *Epander* whom he calls a "new king." But the name of this king had already been made known by me in this Journal for 1860, p. 396, from a similar copper coin in my own possession. Since then I have obtained a hemidrachma of Epander, in bad order, and another copper coin in very bad preservation.

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seeming mystery is simple enough. There are *two* distinct inscriptions at Pehoa, which have been taken by Rajendra Lal as forming only one record. The first inscription of twenty-one lines which contains the names of Mahendra Pâla, Vajrata, Gogga, &c., is given by Rajendra quite complete; but of the second inscription he has given only eight lines out of sixteen and a quarter lines. It is this second inscription which contains the names of Raja Râmabhadra Deva, and Raja Bhoja Deva, together with the date, which is written at full length in words, as well as in figures—thus:

samvatsare satadwaye shadsaptatyadike (?)
Vaisâkhamâsa sukla paksha saptasyâm.
Samvat 276 *Vaisâkha sudi* 7.

all of which may be read in Rajendra's own facsimile.

The date of the inscription being thus conclusively settled, it now remains to ascertain the era to which the date refers. This I believe to be the era of *Sri Harsha* of Kanoj, beginning in A. D. 607, which would make the date of the inscription A. D. 882. Now at this very time we know that a Raja Bhoja Deva was paramount sovereign of Gwalior, as his inscription, carved on the rock itself, is dated in Samvat 933, or A. D 876. From the Raja Tarangini also we learn that a Raja Bhoja contended with Sankara Varmma of Kashmir, who reigned between the years 883—901 A. D. I am quite satisfied that all these records refer to the same Prince, Bhoja Deva, who was Raja of Kanoj during the last quarter of the 9th century, or from about A. D. 875 to 900.

To prove this last statement it will be sufficient to show that Bhoja Deva, son of Râmabhadra Deva, was Raja of Kanoj about the date specified. Now the genealogy of this family, consisting of eight names, is given in the Benares copper-plate (Journ. As. Soc. Bengal, XVII. 71) in which Râmabhadra Deva and Bhoja Deva are the 4th and 5th names. The date of the inscription which is recorded in the reign of Bhoja's great grandson, is 65, which must refer to some recent era, and is not therefore of any assistance in fixing the actual date of this copper-plate. But the name of Bhoja's great grandfather, *Vatsa Raja*, is found in another copper-plate which is dated in 730 of the *Sake Salivahâna* or A. D. 808. In this record it is stated that *Paura Raja*, the father of the inscriber, had conquered *Vatsa*

Raja "who had become intoxicated with the wealth of the king of Gaur," (see Journ. Royal As. Soc. V. 350). According to this statement *Paura Raja* must have been reigning just one generation, or twenty-five years, prior to A. D. 808, or in A. D. 783. His antagonist Vatsa Raja may therefore be dated about A. D. 800, and Vatsa's great grandson Bhoja Deva about seventy-five years later, or in A. D. 875.

The result of all these concurring dates is to give us a very good and almost continuous outline of the history of Kanoj from the end of the sixth century down to the Muhammadan conquest, or for upwards of six centuries. The different dynasties may, according to my view, be dated as follows.

I.—BAIS RAJPUTS.

A. D. 575. Prabhâkara Vardhana.
600. Râjya Vardhana.
607. *Harsha Vardhana*, founder of the era.
650. (Harsha's death).
700. Ranmal, invaded Sind (Journ. As. Soc. Beng. X. 188).
715. Harchand, contemporary of Muhammad bin Kâsim (Abul Fazl).
730. Yaso Varmma, conty. of Lalitaditya of Kashmir (Raj. Tar.)

Benares copper-plate.

775. Devasakti Deva.
800. Vatsa Raja Deva.
825. Nâgabhatta Deva.
850. Râmabhadra Deva, } of Pehoa inscription.
875. Bhoja Deva, }
900. Mahendra Pâla Deva.
920. Bhoja Deva II.
930. Vinâyaka Pâla Deva.

TOMARAS.

979. Sallakshana.
1005. Jaya Pâla.
1021. Kumâra Pâla.
1051. Ananga Pâla, refounded Dilli.

RATHORS.

1050. Chandra Deva.
1080. Madana Pâla.
1115. Govinda Chandra.
1165. Vijaya Chandra.
1175. Jaya Chandra.
1193. *Muhammadan conquest.*

Note on the Fossils in the Society's Collection reputed to be from Spiti.—By T. OLDHAM, *Esq., F. R. S., &c., &c.*

In the Journal of the Asiatic Society of Bengal for the present year (1863), page 124, a paper is published descriptive of some of the fossils collected by Dr. Gerard in the Spiti district in the North-Western Himalaya, which fossils had been in the Society's Museum for many years, having been presented by Dr. Gerard in 1831.

The paper referred to, is said to be a 'revised copy' of one read before the Society in November, 1861. The original paper, of which a brief abstract was given in the Journal of the Society, 1861, page 418, had been ordered for publication by the Council of the Society, but some delay occurred in the preparation of the plates to illustrate it, in consequence of the author having temporarily left India at the time, and it was not issued. Meanwhile changes in the author's views having taken place, he first desired that the paper should be issued as originally drawn up, with a postscript, but subsequently on his return to India he states that he 'withdrew' the paper and 'modified' it into its present form in which the conclusions arrived at are in several important respects just the opposite of those originally announced.

This was indeed, as the author says, "A very considerable alteration;" but the paper in its present form never having been submitted either to the Council, or to the Society, having been in fact withdrawn, and so altered without the sanction of the Council having been obtained, there has been I regret to say, no opportunity, previously to its publication, of communicating with the author.

It is not my intention to discuss in any way the correctness or incorrectness of the identification of species in the collection. This

important question can only be taken up with advantage, when the whole series of the fossils from the same localities, now in other collections, shall have been examined. My present remarks are confined solely to the brief and general notice which Mr. Blanford has prefixed to his paper, and to the results there announced.

The facts appear to be these. In 1828 Dr. Gerard collected in the valley of the Spiti and in adjoining localities, a large number of fossils, (Gleanings in Science, Vol. I. page 109.) Of these a selection was forwarded to the Asiatic Society in 1831, (Gleanings in Science, Vol. III. p. 92.) These fossils excited great attention both from the interest attaching to the fact of their having been found in the very heart of the Himalaya, and also from the marked similarity of some of the species to known English forms. The collection was almost immediately examined by the Rev. Mr. Everest, and, at his request, a portion of it was sent to England to Mr. Sowerby. On the 8th of June, 1831, Capt. Herbert read a paper on these organic remains, which was published with a plate, in September of the same year (Gleanings in Science, Vol. III. p. 265.) This plate was a small etching from the more finished drawings of the same fossils prepared to illustrate the paper by Mr. Everest published in the 18th Volume of the Asiatic Researches, p. 107. Both these plates and reduced etching were prepared by Mr. James Prinsep himself. Again in 1832, Captain Gerard on the part of his brother forwarded to the Society 164 packets of fossils from the Himalaya, (Journ. As. Soc. Bengal, Vol. I. p. 363,) and in October he forwarded the first part of his brother's paper on Spiti, which also appeared in the 18th Volume of Asiatic Researches. Meanwhile Mr. Sowerby's reply to the reference of these fossils to him was received, dated October 14th, 1831, confirming Mr. Everest's conclusions, (Journ. As. Soc. Bengal, Vol. I. p. 248.)

From all this, it is clear that no time had been lost in taking up the examination of the fossils sent by Dr. Gerard; that these fossils came at once into the keeping of Mr. James Prinsep, were examined by Mr. Everest, and by Captain Herbert; were carefully drawn; that a portion of the collection and the figures were then submitted to Mr. Sowerby, and were *at once by him recognized as similar to others from the same localities which he had seen with Mr. Stokes and Dr. Buckland.* I conceive that the names alone of the gentlemen I have mentioned are abundant guarantee that no sufficient care was wanting

on their part to prevent any admixture of fossils from any other collection with those sent by Dr. Gerard. It seems beyond a question that Mr. Prinsep, Capt. Herbert, Messrs. Everest and Sowerby were all quite satisfied that the fossils figured on the plates I have referred to, had actually come from Dr. Gerard, and whatever confusion or neglect may have resulted in after years, the Society's collections at that time were certainly not in the disgraceful state of which Mr. Blanford so justly complains. It is then, I think, certain that these fossils from Dr. Gerard had not been accidentally mixed with the English fossils *after* they had come to Calcutta, and I think every one who reads Dr. Gerard's papers will also admit that he did not carry with him a collection of English Liassic fossils with which the Spiti collection could be 'accidentally' mixed, *before* its despatch to Calcutta. It must be borne in mind also that the plates of these fossils were published within a comparatively short time of discovery of them, when the error of having any admixture of English fossils could have been discovered.

Of seven species of ammonites so figured by Mr. Prinsep, and described by Mr. Everest and Mr. Sowerby as part of Dr. Gerard's collection, the author of the paper I refer to entirely rejects as 'spurious,' and as being English specimens, no less than five. Others, although there is not nearly so much evidence of their being from Spiti, are as unhesitatingly admitted as genuine.

M. Jacquemont visited the neighbourhood of Spiti in 1830, and brought away a noble collection of fossils which have unfortunately since remained undescribed in the Museum, Paris (with the exception of one or two species noticed by L. Von Buch.) Subsequently in 1860, I despatched Messrs. Theobald and Mallet, both of the Geological Survey of India, to Spiti, during the time when work in the plains of India was impracticable, with instructions to bring away as full a collection of fossils as the time they could devote to it would permit, and to make such notes and observations as would elucidate the Geological structure of the district. A brief account of the trip was given to the Society by Mr. Theobald and published in 1862, (Journ. As. Soc. Bengal, 1862, p. 480.) The collection made by these gentlemen was a good one considering the brief time at their disposal, but could not at all be accepted as fully illustrating the Geology of the valley. Mr. Theobald subsequently, in the spring of 1862, when

putting out and examining these fossils collected by himself, and Mr. Mallet, visited the Society's Museum to compare those species already named and described by Mr. Blanford. Among these he noticed several species of which *no* specimens had occurred to himself or to Mr. Mallet, and on examining these specimens more closely he noticed also a difference in the mineral character of the rock in which these species occurred. He at once, too hastily as I think, and without examining into the history of these fossils, but knowing well the neglect with which the Society's collections had been treated, came to the conclusion that these were not fossils from Spiti at all, but were English Liassic fossils, which had got mixed up with the true Spiti fossils. This idea he communicated at once to Mr. Blanford who at first rejected the notion, but subsequently, as stated by himself, adopted it fully.

Believing that there are no sufficient grounds for this conclusion, I cannot avoid noticing it. The question as regards Dr. Gerard's fossils alone would be of minor importance, but this matter involves a principle subversive of all sound progress in our knowledge of the Geological distribution of organic remains.

The grounds on which Mr. Blanford has rejected all those fossils which he had identified with English Liassic species are stated to be these.

1. Mr. Theobald's belief to that effect, which belief I know to have been based on a consideration of a slight difference in the mineral character of the rock.

2nd. An examination of undoubted Whitby fossils.

3rd. An examination of Col. Strachey's collection from the Niti pass, north of Kumaon.

4th. An examination of General Hardwicke's collection from Nepal, and—

5th. An examination of Jacquemont's collection from near Spiti.

Putting out of the question for the moment Jacquemont's collections which were from nearly the same ground as Gerard's, I cannot see in what way the nature of the fossils found at Whitby in Yorkshire, of those found in Nepal some five hundred miles off, or at Niti more than one hundred miles off, can possibly determine the *fact of the occurrence or non-occurrence of certain forms at Spiti*. There is no question here as to the identity or even the similarity of the species, in determining which a comparison of the others would un-

questionably be useful; the question is simply do they occur, or do they not. I reject as useless also, in any bearing on this fact, the consideration of the nature of the rock in which they are found. Differences or resemblances in mineral character are utterly worthless as guides to such facts.

The non-occurrence of the species referred to in Jacquemont's collection, and in that made by Messrs. Theobald and Mallet remains. Now did two persons visiting even a single quarry to collect fossils after an interval of time ever come away with the same species? But here was not a quarry but a district stretching over some fifty miles of difficult country. The fact that these species did not occur to Jacquemont, or afterwards to Theobald and Mallet, no more disproves the fact they had previously occurred to Gerard than any other case of this kind. It might just as conclusively be argued that some of the beautiful fossils from the cretaceous rocks of S. India which were originally collected by Messrs. Kaye and Cunliffe and described by E. Forbes, were not from that district at all, but from some other and far distant locality, and had been 'accidentally mixed' up with their genuine collections, because the same species were not met with by Mr. Blanford himself in his subsequent and much more detailed examination of the same area.

But there is still another and to my mind a conclusive proof that the specimens rejected by Mr. Blanford did really belong to Gerard's collections, a proof which I should have been glad to communicate to Mr. Blanford had there been an opportunity. A reference to Mr. Sowerby's letter which I noticed above, will show that similar fossils are said to have been in the possession of Dr. Buckland. To that Geologist, then one of the most zealous palæontologists in England, a fine series of these Spiti fossils were sent by Dr. Gerard himself. This collection still exists among the other treasures of the Oxford Museum, and I had the pleasure of going over it carefully with Prof. Phillips last year, having visited Oxford for the purpose. It cannot be supposed that in this series also Whitby or English fossils had got mixed either 'accidentally' or otherwise. The care with which the collections at Oxford have been kept is sufficient to render this idea untenable for a moment. But in this (Gerard's) collection at Oxford are several specimens of several of the species* noticed by Mr. Blan-

* I may mention noteably *Ammonites bifrons*, *Am. communis*, both of which

ford, and by him rejected as spurious Spiti fossils. I think this fact quite conclusive, and that all the specimens so hastily rejected as Spiti fossils by Mr. Blanford must be restored to their proper place in this interesting and valuable collection.

I said before that I had only to deal with the facts, what the conclusions derived from those facts may be is not now under discussion, and whether there be in the Spiti district Liassic beds or whether these Liassic species* occur in the same beds with others, supposed to belong to different periods are questions which must await future solution. I regret that the circumstances I have mentioned above, (viz., that this paper by Mr. Blanford in its present state never had come before the Society or Council) prevented my having an opportunity of making the author acquainted with the fact, that in another portion of Dr. Gerard's Spiti collections, several specimens existed of the very species which, on such insufficient grounds, he has rejected here.

I cannot, however, conclude without again directing serious attention to the very great mischief arising from dealing with questions of fact in this way. If the fact of the occurrence of certain forms in certain places is to be thus questioned, and fancy or some supposed mineral resemblance is to be accepted as negativing the deliberate statements of those who had collected the fossils, supported by the evidence of careful investigators who had examined these fossils almost immediately after their discovery, (and not thirty years after), there can be no progress. It would be infinitely better, and infinitely safer, to leave such specimens, as they are said to have been found, without labels, or even to throw them out, than to falsify all the landmarks of science by exhibiting them with localities attached which are only imaginative. The specimens referred to are now (September 18th, 1863,) put out in the Society's Museum (by whose authority I know not) mounted and carefully named and marked, *Upper Lias, Whitby, England*, without any note of doubt, and without any reference whatever to the fact that they had ever been even supposed to come from Spiti. Collections thus treated are worse than useless, they are mischievous.

occur in the Society's collection; also *Am. crassus*, Phillips, a true Liassic species but of which specimens do not occur in the Society's cabinet.

* *Ceratites Himalayanus*, Blanford, is exhibited in the Society's collection as from the *Upper Lias*, Spiti valley.

Notes on the variation of some Indian and Burmese Helicidæ, with an attempt at their re-arrangement, together with descriptions of new Burmese Gasteropoda.—By W. Theobald, *Esq., Junior.*

Since my paper on the distribution of our Indian terrestrial Mollusca was read at the February meeting of the Asiatic Society, several new species have accumulated on my hands, which I propose to describe in the present paper, and at the same time, to offer some remarks on certain nearly allied forms, which a careful examination compels me to consider, as merely well marked and persistent types of one species, connected as they are by intermediate forms, whose number is constantly on the increase.

The question of where variation ends and specific separation is called for, is of course not easily settled by any precise rule, and has always been regarded as depending more or less on the peculiar views or idiosyncracy of the individual naturalist, and has resulted in the manufacture of an erroneous number of new species, ostensibly of equal value, but many of them in reality entitled to no higher rank than varieties. I myself have offended in this way; but whilst deprecating for the future the creation of species, in the unqualified manner hitherto too common, I prefer a specific (or sub-specific) name for all well marked local forms, to the method advocated by some, of indicating such shells by a letter of the alphabet, as var A or var B of the type, or first described individual, however little it may merit such distinction save on the ground of mere priority.

My friend Mr. H. F. Blanford, has already done good service by decimating the ranks of shadowy species ranged under the genus Tanalia, in his paper in Volume XXIII. of the Linnæan Transactions, wherein he reduces the *twenty-six* recorded species of the genus to *two*, *Tanalia violacea*, Layard, and *T. aculeata*, Gmel. which last shell exults in no less than twenty-four synonyms, (twelve contributed by Reeve, nine by Dohrn and three by Layard).

This genus (Tanalia) well illustrates in my opinion the advantage of retaining a distinctive name for well marked types of what, critically viewed, is but one species, for a considerable amount of obscurity, quite unredeemed by superior brevity, results from the use of simple letters, rather than well chosen and distinctive epithets for well marked local types, many of which have hitherto, though erro-

neously, stood as distinct species. Whilst therefore concurring in the results of Mr. Blanford's examination of the genus Tanalia, I would prefer retaining the known designations of such well marked types as *T. Tennentii*, *T. neritoides*, and the like, to recording them all as *T. aculeata*, Geml. *var.* A or *var.* B.

The alphabetical or numerical method of discriminating varieties, would certainly possess considerable advantages if all the varieties of a species could be arranged in an unbroken right line, instead of one very much given to ramification, but even in that case the type species by priority would often have to be set aside, as falling naturally into some other position, than at the head of the series; I therefore shall retain, in this paper, many names which I now regard as of merely sub-specific value instead of discarding them *in toto* as soon as their identity, if critically considered, with some previous species is established; and shall on the same principle, bestow distinctive names on those which of the shells herein described I regard as merely local races.

It might at first be imagined that strong support was derivable, from the enormous variation of form of some widely spread species, for the Darwinian view of the gradual extension by migration of all species in space, and the simultaneous change undergone by them, to meet changed conditions of existence, resulting in local types, and ultimately by the decay of intermediate forms, in so called distinct species; but this idea is speedily negatived by the consideration, that though some species exhibit an amount of variation, which might be plausibly accounted for by the Darwinian theory, yet others not less widely spread, either as to time or place, exhibit little or no such tendency, which seems rather a peculiarity (of temperament so to say,) marking certain species, than the result of a general law regulating the development of all. A notable example of this is afforded by the little *Helix labyrinthica*, Say, which has remained unchanged during the eons which have elapsed since the Eocene period, occurring fossil in the Headon beds on the Isle of Wight, and living at the present day in Alabama. *Bulimus punctatus* and *Bulimus pullus*, Gray, may also be quoted, the first species inhabiting, unchanged to any perceptible extent, the plains of India and the shores of Mozambique, whilst the last ranges widely through India and some of the neighbouring countries, (Burma and even the shores of the Red Sea,) and occurs fossil in the alluvial deposits in the Nerbudda valley, where individuals, undis-

tinguishable from recent specimens, accompany the extinct fauna which embraced the Hexaprotodon and its congeners: (vide Memoirs of the Geological Survey, Vol. II.)

Of species subject to considerable local variation, *Helix Huttoni* may be selected, if, as I am inclined to think, it may be regarded as specifically identical with *H. rotatoria* V. dem Busch; and the highly variable *H. similaris*, Fer., with respect to which it may here be remarked, that its most variable and dissimilar forms, are not those most widely dissociated in space, as might be surmised from the Darwinian explanation for such variations, as its local Indian forms more widely differ from the type and from one another, than individuals from the far off Mauritius and the Brazils.

HELIX SIMILARIS, Fér.

At the head of the varieties, as I regard them, of this species, I place *H. scalpturita*, B. This form inhabits the Irawadi valley above the British frontier, and is a stout well marked shell passing by degrees into *H. Zoroaster*, Th., though in this case as in others, the intermediate forms are usually scarcer individually and more variable than the types they tend to unite. Allied to some extent, but not very closely, is *H. Peguensis*, B., from I believe, the Eastern parts of Pegu. *H. Zoroaster* which is intimately related to *H. scalpturita* on the one hand and *H. similaris* on the other, occurs in tolerable number about Thaiet mio and the neighbourhood, and passes gradually into the type form of *H. similaris*. *H. pilidion*, B., is a thin-keeled shell related to *H. similaris*, from probably the same locality as *H. Peguensis*, and last comes the rotund, globular shell common about Thaiet mio, Prome, &c., described by Benson as *H. bolus*. Several intermediate gradations occur between *H. Zoroaster*, *H. bolus* and the type *H. similaris*, but not sufficiently marked to require special enumeration; the whole may thus naturally be arranged as below, those marked thus * being aberrant, the forms required to connect them more closely, having probably to be discovered.

H. scalpturita, B.	Ava.
*H. Peguensis, B.**	
H. Zoroaster, Th.	Thaiet mio, Prome, &c.
*H. pilidion, B.**	
H. similaris, Fér.	Thaiet mio, Bengal, Mauritius.
H. bolus, B.	Thaiet mio, Prome, &c.
*H. cestus, B.**	Khasi hills.

Of *H. cestus* I have but three individuals, but they seem to form merely a well marked local type of the species under consideration. They occur with or without the band; the two varieties differing slightly in other respects as well; somewhat as *H. Pequensis* does from *H. scalpturita*, the bandless variety of which it much resembles.

H. ROTATORIA, V. dem Busch.

This species, though affording strongly marked varieties, is not a variable one individually. We have in Burma the larger and more common form of seventeen millemeters, which varies very slightly, and a smaller form (*H. Arakanensis*, Th.) of only thirteen millemeters, with a higher spire, which also varies very little; and evidently connects the species with *H. Huttoni*, the largest specimen of which from India in my possession is also thirteen mills. but with a flatter spire than the small var. of *H. rotatoria*. There is also the very variable race of *H. Akowktongensis*, Th., with its usually flattened spire, holding a place between the large and small forms of *H. rotatoria*.

H. tapeina and *H. Phayrei*, Th. also claim a place near the type of the species, the first nearly equalling a large *H. rotatoria* in size, whilst closely resembling a small one in form, and the second differing from the type *rotatoria*, in its narrower umbilicus, and more strongly marked sculpture. The little Indian *H. Huttoni* follows, chiefly differing in its small size, which may be averaged at eleven mills.

Most aberrant of all comes *H. Oldhami*, B. with its depressed spire, but it hardly differs more widely (save in one extra whorl), from a large *rotatoria* in form, than specimens of *H. Akowktongensis*, Th. do from one another. Intermediate forms are, however, requisite to connect *H. Oldhami*, B. as closely as the rest are.

H. rotatoria, V. d. Busch.	Irawadi valley, below the frontier.
H. tapeina, B.	Khasi Hills.
H. Phayrei, Th.	Irawadi valley, above the frontier.
H. Arakanensis, Th.	Arakan hills and Irawadi valley.
H. Akowktongensis, Th.	Irawadi valley.
H. Huttoni, B.	Himalayas, Southern India.
*H. Oldhami, B.**	Irawadi valley, above the frontier.

HELIX FALLACIOSA, Fer., is another variable shell, presenting three distinct types, as *H. asperella*, Pf. and its allied forms *H. Nagporensis*, Pfr. and *H. propinqua*, Pfr. *H. fallaciosa*, Fér., with its varieties and ally *H. Helferi*, B. and *H. ruginosa*, Fér. with its ally *H. crassicostata*, B.

The whole are so closely united as to be separable only one from another by the most arbitrary division. They may naturally be ranged thus:—

Camlena Albers.	*H. Nagporensis, Pfr.*	Central India.
	H. unicincta, B. (H. propinqua, Pfr.	Central India, Bombay.
	H. asperella, Pfr.	Central India.
	H. fallaciosa, Fér.	Ceylon, South India.
	H. ruginosa, Fér.	Southern India.
	H. crassicostata, B.	Salem (?).
	H. Helferi, B.	Andamans.

H. climacterica, B. No one on first examining a type-specimen of this shell of twenty-one mills. in diameter, would imagine there was any Indian shell very closely connected with it, but on examination of the small variety of from thirteen to fifteen mills., (for which I propose the term *H. geiton*, "γειτων") a close relation is perceptible between it and *H. pansa*, B. on the one side and *H. ornatissima* on the other. The type form of *H. climacterica* is very peculiar, and is seen also in the smaller *H. geiton*, but in this last it is more subject to variation, so that some specimens are not much more keeled than *H. pansa*, B. whilst others unite this extreme form with the type. The main distinction seems to be, a more closed umbilicus in *H. climacterica*, than is observable in the others; a stouter shell more strongly keeled and more deeply sculptured. *H. ornatissima* whilst closely resembling the type as regards sculpture, departs from it in being less keeled, and in its umbilicus being more open, whilst *H. pansa*, B. is usually far less strongly sculptured than the type and thinner, but is more keeled and has a closer umbilicus than *H. ornatissima*. *H. anopleuris*, B. is merely a stout handsome *H. ornatissima*, on a large scale, ranging from fifteen to twenty-one mills. in diameter, my largest *H. ornatissima* being but sixteen mills. Intermediate forms there doubtless are, but the natural arrangement seems to be thus—

H. climacterica, B.	Khasi Hills.
H. geiton, Th.	Khasi Hills, (a dwarf *climacterica*).
*H. pansa, B.**	Irawadi valley.
H. ornatissima, B.	Darjiling.
H. anopleuris, B.	Hills North of Tirhoot (Soomeysur hill).
*H. submissa, B.**	Ditto ditto.

An equal amount of variation in the keel may be often remarked

in *H. textrina*, B. some specimens of which in my possession are strongly keeled, whilst in others this character is nearly obsolete. Whatever may be thought however of my uniting such dissimilar shells as some of the above, better grounds exist for the union of some which now follow.

H. infrendens, Gould.	Farm caves near Maulmein.
H. capescens, B.	Ditto.
H. Tickelli, Th.	Ditto.
H. castra, B.	India, Birma.
H. sanis, B.	Andamans.

which is I think merely a large depressed variety of *H. castra* of fifteen mills.

H. capitium, B.	Tributary Mehals of Katak.
H. hariola, B.	Pegu.

I agree with Mr. W. T. Blanford in being unable to find any difference between the Katak shell and the keeled variety of *H. hariola* from Pegu, save a trifling superiority of size in the former.

Galaxias Beck.

H. Tranquebarica, Fab.	Southern India.
H. semirugata, Beck.	Ditto.
*H. ligulata, Fér.**	Upper Bengal.
H. vitellina, Pfr.	Central India.
H. bullata, Hutton.	Ditto.

Of these shells, the two first are perhaps the least defined, and the whole have a tendency to pass into each other. *H. ligulata* is the well marked depressed form found in Bengal and *H. bullata*, H. of only nineteen mills. in diameter, I have from Mhow. I shall now describe a few novelties which have lately occurred to me.

Family Oncidiadæ.

Vaginulus Birmanicus, H.

Corpore elongato, lævi, ante et pone eleganter rotundato, colore fusco, minutissime flavo maculato, subter albescente. Pede transversim rugoso, totius corporis longitudinis, sed vix ad quartam partem latitudinis attingente. Tentaculis quatuor; binis superioribus fuscis, oculiferis; inferioribus minus elongatis quamquam robustis, et papillam retractilem, sensu acutissimo præditam, subter gerentibus.

Habitat in locis humidis apud Rangoon, Pegu, Thaiet-mio, &c.

Longitudine, 50 mills.

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This slug is pretty common at Rangoon and is found harbouring under potsherds, bricks and rubbish in moist spots.

Family Limacidæ.

Limax viridis, Th.

Corpore expanso, pone acuminato, flavo cinereo. Pallio magno, læte colorato viridi-flavo limonis. Tentaculis superioribus, longis, pallidis, oculos parvos nigros gerentibus; et lineâ pallide smaragdinâ ad basin notatis. Tentaculis inferioribus minutissimis.

Habitat inter folia in dumetis marinis "mangrove" dictis apud littus Peguense, prope fines provinciæ Arracan.

This elegant little limax is very active and creeps about briskly on the green foliage of the salt swamps, which (*i. e.* the leaves) it resembles in colour.

In my last paper I included two limaces, *L. Memnon* and *L. Bengalensis* of which I unfortunately have no descriptions. The first is a large black slug from Hoshungabad, the other a small grey slug from Dinajpur.

Hoplites.

This genus is formed for the reception of some large slugs, common at Teria Ghat near Sylhet. I have unfortunately no notes, but the animal is like Vitrina and closer perhaps to that group than to the slugs. It has a tough membranous plate on the centre of the back, conspicuous in the living animal, but no shelly plate. Its total length is about two inches.

Family Helicidæ.

Vitrina Peguensis, Th.

Animale pallide lutescente anteriori parte corporis virescente; posteriori tamen luteo-flavescente. Tentaculis superioribus longis et cum cervice virescentibus: inferioribus parvulis; Pallio granulato' cutis anserinæ modo; fusco, testam omnino fere obtegente. Caudali papillâ nullâ. Longitudine 80 mills.

Testâ elongatâ, halitoideâ, politâ, subdiaphanâ; margine tenui, virescente; reliqua parte flavescente, et juxta apicem solidissimam albescente. Long. 15. Lat. 9. Alt. 4 mills. Habitat in humidis locis prope Pegu. This species belongs to the same section as V. Gigas, B. which it resembles in miniature and is remarkable for its very solid eslumella and apex.

Vitrina Christianæ, Th.

Testâ sub-globosâ, tenui, politâ, diaphanâ, nitidâ, supra costulate striatâ, infra planiore. Colore succineo. Apice pallido, vix elevatiusculo. Peripheriâ rotundatâ. Aperturâ parum obliquâ. Anfractibus 3½ lente crescentibus. Long. 13. Lat. 11. Alt. 3 mills.

Habitat in insulis Andamanicis.

I have much pleasure in naming this shell after the lady of the present Governor of the settlement, Lieut.-Col. Tytler, as a mark of esteem and in pleasing remembrance of my sojourn at Port Blair in his hospitable mansion. It is of the same type as *V. Bensoni*, Pfr. but is at once distinguished from all species I am acquainted with by its rich brown colour.

Helix exul, Th.

Testâ auguste umbilicatâ, depresso conoidea, lævi, tenui, striatulâ, concolore fuscâ. Apice obtuso. Anfractibus sex, tarde crescentibus, convexiusculis, ultimo non descendente. Apertura obliquâ-Peristomate recto, tenui, juxta umbilicum leviter reflexo. Long. 16.5, Lat. 15, Alt. 8.5 mills. Habitat in insulis Andamanicis. This shell seems a Nanina and somewhat recalls *N. semifusca*, Dh. but is a more tumid species.

Streptaxis Blanfordi, Th.

Testâ perforatâ, depressâ, ovali-oblongâ, oblique costulatâ, striatâ, translucente ; spirâ obtuse conoideâ. Anfractibus sesqui-quinque non augulatis. Aperturâ obliquâ, subquadrato-oblongâ : lamellâ parietali unâ et dente singulo in mediâ parte superioris marginis. Peristomate expanso, juxta umbilicum reflexiusculo, marginibus callo tenui interdum junctis. Varietas reperitur dente carens. Long. 7.5 Lat. 5.0 Alt. 4.0 mills. Habitat montibus Arakanensibus provinciâ Pegu. *S. Andamanicæ*, B. peraffinis, sed differt dente marginali, apertura, et umbilico parum apertiore. Ab *S. Birmanica*, Bl. differt formâ minus globosâ, aperturâ et minore magnitudine.

Streptaxis Birmanica. W. Blanford, (in MSS.).

Testâ perforatâ, ovali-oblongâ, depresse-globosâ, lævi, flavescente, diaphanâ, spirâ obtuse conoideâ. Anfractibus sex convexiusculis, leviter costulate striatis ; ultimo subter lævigato, et circum umbilicum compresse-angulato. Suturâ profundâ. Aperturâ perobliquâ, subtriangulari-quadratâ. Dente parietali unico, magno, alteroque parvulo, in parte anteriori marginis superioris posito. Peristomate expanso, reflexiusculo. Long. 9.0. Lat. 6.5. Alt. 5.0 mills. Varietas

minor invenitur dente marginali carens. Long. 8 mills. Habitat, Pegu. Var minor prope fontes fluminis, Pegu dicti.

A single specimen of this shell was received by me from Mr. W. T. Blanford, and I subsequently found two specimens of the smaller variety. It very closely approaches *S. Blanfordi*, Th. and *S. Andamanica*, but is not so depressed in form, and it differs from *S. Petiti* chiefly in its more triangularly quadrate mouth, marginal tooth and smaller size, (my largest, average, and smallest specimens of *S. Petiti* measuring in length respectively, 14.11 and 9 mills.).

The distinction however between these shells is only sufficient to constitute a well marked race. *S. Blanfordi*, Th. ranging with *S. Andamanica*, and *S. Birmanica*, Bl. with its ally *S. Petiti*.

Clausilia Masoni, Th.

Testâ arcuato-rimatâ, fusiformi, tenui, costulate-striatâ, pallide castaneâ. Apice intacto. Suturâ excavatâ. Anfractibus decem, sub-planatis, ultimo augustiore, supra aperturam fortiter striato, juxtaque suturam fossâ, laminæ interioris cursum monstrante, notato. Lunellâ distinctâ; interdum non. Lamellis quinque, duabus parietalibus tenuibus, distinctis, intus conniventibus; reliquorum binis fortibus ad aperturam divergentibus; tertiâ post lunellan valde tenui, inconspicuâ. Aperturâ rotundato-auriformi-solutâ. Peristomate expanso, reflexiusculo. Longitudinis 21 ad 29 mills. Latitudinis 4 ad 5 mills.

Habitat prope Tonghoo in montibus inter Provincias Pegu et Martaban.

This species varies somewhat in size and some specimens have a more slender spire than others. I have named it in compliment to the Rev. F. Mason, D.D., who kindly supplied me with specimens, and whose success, among the wild Karen tribes, will ever cause his name and that of his talented and energetic wife, to be enrolled in the foremost rank of missionary labourers in the East.

Family Cyclostomidæ.

Cyclophorus arthriticus, Th.

Testâ umbilicatâ, turbinatâ, solidissimâ, striatâ, lineisque spiralibus flexuosis obscure decussatâ; sublævi, non politâ, fuscente castaneâ fasciâ latâ, albâ medianâ, interdum circumdatâ. Interdum colore omnino albâ, spira pallide castaneâ, et fascia parvâ castaneâ sub-mediana ornatâ. Anfractibus quinque convexis, haud tarde crescentibus; ulti-

mo valde capaci, rotundato. Aperturâ circulari. Peristomate expanso, reflexiusculo, valde incrassato, continuo, intus flavo, interdum cæruleascente. Apice pallide purpurascente-rubicundula.

Long. 52, Lat. 39, Alt. 37 mills. Apertura 29 mills.

Habitat in collibus nemorosis circum fontes fluminis Pegu dicti. A very solid shell with the surface rarely in good condition and rather sparsely distributed. It is barely so globose as *C. flavilabris*, B. to which it is nearly allied, and from which it differs in sculpture, form and greater solidity.

With respect to *C. patens*, Bl. I find myself unable to regard it as a distinct species or even race, but merely as an individual variety of *C. fulguratus*, Pf. as I have no where observed it sufficiently numerous to be viewed in any other light. Another marked variety of *C fulguratus* also occurs with a large thin shell and white or cærulescent peristome, in some places not rarely: but it is clearly an individual variety of the predominant form. Both these varieties are good illustrations of how races originate, and [become?] eventually what most systematists would regard as distinct species; not as some would argue, by change effected by migration, or enforced to meet changed conditions of good climate or the like, but by individual aberration, and the cotemporaneous up-growth of aberrant individuals into races and eventually species, as the Darwinian most correctly asserts: but not as far as I can see by any pressure of physical conditions co-relatively, as the Darwinian theory no less incorrectly argues. Some other principle, than of mere dependance on physical conditions, has yet to be discovered, before the problem of what governs variation, or in other words the "*origin of species*" can be regarded as satisfactorily solved.

Pupina Blanfordi, Th.

Testâ pupinæformi, politissimâ, flavescente-corneâ. Anfractibus quinque. Peristomate albo, non expanso. Canalibus albis. Long. 6, Diam 3.5 mills. Habitat, Pegu.

This species was forwarded to me by Mr. W. T. Blanford as a possible variety of *P. Peguensis*, B. It is intermediate in its characters and aspect, between *P. Peguensis*, B. and *P. artata*, B., to the latter of which it more closely approaches in the shape and unreflected form of its peristome. Whilst in fact *P. Blanfordi* ranks naturally as a near ally of *P. artata*, B., *P. Peguensis*, B. holds a similar relation to *P. arula*, B, and it is questionable if all four species will not prove to be

equally connected; *P. Peguensis* coming between *P. artata* and *P. arula*.

P. Arula, B. P. Peguensis, B. P. Artata, B. P. Blanfordi, Th.

Pomatias Peguense, Th.

Testâ auguste sive obtecte umbilicatâ, turritâ, costulate striatâ, translucente, flavescente-corneâ. Apice obtuso, lævi. Anfractibus septem sive octo, tumidis, lente crescentibus. Aperturâ sub-circulari. Peristomate duplici, extra brevissime expanso, intus continuo, crasso, juxta suturam leviter inciso. Operculo tenui corneo.

Long. 10. Lat. 3.5 mills. Apertura 2.5 mills.

Habitat in monte marmoreo, cavernoso, haud procul a Gwa, pago littore Peguensi.

This Pomatias is accompanied at the Limestone hill near Gwa by the following shells which I give to illustrate the range of some of them.

Helix delibrata, B.
H. textrina, B.
H. honesta, Gould.
H. castra, B.
H. rotatoria, V. d. Busch. (small).
H. bascunda, B. var.
H. gratulans, Bl.
Plectopylis plectostoma, B.
Bulimus putus, B. (slender var.)
B. gracilis, Hutton.
Cryptosoma præstans, Gould.
Streptaxis Burmanica, Th.
Cyclophorus Theobaldianus, B.
Leptopoma aspirans, B.
Pupina artata, B.
Alycæus scepticus, Bl.
Hydrocena pyxis, B.
Diplommatina.
Helicina.
Pomatias Peguense, Th.

The Diplommatina I have not made out, as I got no good specimens. The Helicina is very variable, and is I have no doubt *H. Andamanica*, B. but two distinct varieties occur, differing chiefly in size, and both smaller than the type, (as I regard it) from Port Blair, but as some of these shells may have been described before, I refrain from naming them. They are respectively five and six mills. diameter whilst the type measures eight mills. From the Andamans, however, I have a single small Helicina, smaller than either of those from the mainland, and I believe all four forms are merely races, all merging into each other, but my sole specimen has gone home to Mr. Benson, who, from its vast discrepancy in size from the type he is acquainted with, will probably regard it as a distinct species. *Haud ego.*

I cannot conclude this paper without offering a few remarks on the arrangement proposed by my friend, Mr. W. T. Blanford, for the Helicidous groups in the Annals and Magazine of Natural History for February, 1863. The division of the whole, into two great GROUPS or SECTIONS,—A marked, by having the mucous pore at the truncated extremity with a superimpending lobe, and—B having the mucous pore in the elongated non-truncate extremity, devoid of an overhanging lobe,—is a natural and probably well marked one, but I think a still farther restriction of the term Nanina, than that Mr. Blanford has adopted, is called for in any natural classification.

We there find *(loc. cit.)* shells of two very naturally divided types all ranged together under NANINA or its subgenus MACROCHLAMYS, B. illustrated respectively by the species, *Vitrinoides*, *lubrica* and *petasus* on the one hand, and *pansa* and similar unpolished shells on the other. A more natural arrangement would surely be to restrict the term Nanina to those shells of the great Section A possessing a polished epidermis, of which *N. vitrinoides* may be regarded as the type, indicatory as such a condition of the surface usually is, of either lubricatory tentacular processes attached to the mouth, as in the type, or of close relations to the more typical species so provided.

This separation effected, the remainder form a natural group of which *pansa* may serve as a type, but want of all books of reference, prevents my offering any generic name, which a little research will soon supply. In this Section A, it may be remarked that Mr. Blanford includes *H. ligulata*, whilst *H. Tranquebarica* and its allies he ranges under Section B.

In the present paper I have included them, from a mere study of the shells, under one group, (GALAXIAS), which I should not have ventured to do in opposition to Mr. Blanford's observations, but for his remark on *H. ligulata*, which "*shows a passage into the other Section.*" It is therefore probably aberrant to some extent from *Tranquebarica*, but not more so perhaps than from the group with which Mr. Blanford has associated it. Mr. Blanford's remark on the similarity of the animals of *H. vittata*, Fér. and *H. fallaciosa*, Fér. is interesting, as a shell given to me by Mr. H. F. Blanford* tends to connect

* *H. proxima*, Fér. Besides the difference in form *H. proxima* has a white interior. *H. vittata* invariably brown or brownish black when adult. H. F. B.

these seeming dissimilar species. *H. vittata* is a very variable shell as the following measurements of specimens in my cabinet show.

A. 28 × 22 mills.
B. 24 × 18 „
C. 20 × 13 „ E. *H. fallaciosa* 14 × 6 mills.
D. 24 × 11 „

Specimens A, B and C of *H. vittata* are all from Ceylon.*

A being a very elevated var, B a depressed var, and C the ordinary small var. D is the shell received from Mr. H. F. Blanford, and though white and more of the form of *H. fallaciosa* than of *H. vittata*, yet it must, I think, be classed as a variety or local race of the last. Numerically reduced the proportions are nearly thus—

A. = 15 B. = 10 C. = 6 D. = 6 E. = 2

So that if allowance is made for a better series of specimens from which measurements might be made, we see that individuals of the type shell A and C differ nearly as much from each other, as specimen E (*H. fallaciosa*) does from C. But this method of stating the relation, very inadequately represents it, D having the aspect and size of *H. vittata*, with the precise depressed form of *H. fallaciosa*, with whose colourless varieties it may be compared, as unlike *vittata*, it is colourless and white. It would be very curious if intermediate forms should eventually be discovered more closely connecting these at first sight utterly dissimilar species *H. vittata* and *H. fallaciosa*.

Thaiet Mio, October, 1863.

* I may add to this list the extreme measurements of specimens in my own collection shewing still greater variability.

	a	*b*	*c*
Diam.	17 m.m.	17 m.m.	29 m.m.
Alt.	18 m.m.	19 m.m.	22 m.m.

Specimen *a* is of uniform chestnut brown, *b* white with faint brown bands and violet apex, *c* white with flesh colored apex. H. F. B.

Errata in Mr. Theobald's paper, in No. 4 of 1863.

Page	*line*	*for*	*read*	*Page*	*line*	*for*	*read*
354,	2,	leaning	bearing.	370,	12,	Boriliæ	Bontiæ.
355,	26,	living	tiny.	375,	14,	Bensoni	Barniana.
358,	7,	focal	wild.	376,	28,	After B add	sp.
367,	32,	bora	vara.	381,	10,	etnilla	rutella.

On Ancient Indian Weights.—By E. Thomas, *Esq.*

[The subjoined article was sketched, with a view to the limited illustration of the subject announced in its title, for insertion in the Numismatic Chronicle: but so large a proportion of its contents have proved in the progress of the enquiry to relate to questions beyond the legitimate scope of that Journal, while they would seem well adapted for the pages of the Journal of the Asiatic Society of Bengal, that I have revised and added to the original paper, in the design of its simultaneous publication in England and in India. I am the more anxious that it should appear in the latter country, as there alone can its higher aims be suitably discussed; thence also must we seek a due definition of the indigenous plants upon whose products these weights are based, and a determination, by actual comparison of growing seeds, of the initiatory scheme of Indian Metrology. From that continent must come the further ethnological and philological evidence, which is to determine many of the questions I have ventured to raise. Wherever the final decision may be pronounced, it is clear the witnesses are still mainly in the land whose past history is under investigation.—Edward Thomas].

The attention of archæologists has recently been attracted to the weights and measures of ancient nations, by the elaborate work of M. Queipo,[1] and the less voluminous, but more directly interesting article of Mr. R. S. Poole, on the Babylonian and other early metrologies.[2] At the present day, when ethnological inquiries engross such an unprecedented share of public notice, any parallel study that may contribute by material and tangible evidence to check erroneous, or suitably aid and uphold sound theories, should be freely welcomed, however much its details may threaten to prove tedious, or the locality whence its data are drawn may be removed beyond the more favoured circles of research.

The system of Indian weights, in its local development, though necessarily possessing a minor claim upon the consideration of the European world, may well maintain a leading position in the general

1. "Essai sur les Systèmes Métriques et Monétaires des Anciens Peuples," par Don V. Queipo, 3 vols. 8vo., Paris, 1859. See also a review of the same, *Journal des Savants*, 1861, p. 229.

2. Article "Weights," Smith's "Dictionary of the Bible," London, 1863.

investigation, on the ground of its primitive and independent organisation, and the very ancient date at which its terms were embodied and defined in writing; while to numismatists it offers the exceptional interest of possessing extant equivalents of the specified weights given in the archaic documentary record which Sanskrit literature, under the regained faculty of interpretation acquired by Western scholars, proves to have preserved in the text of the original code of Hindu law; as professedly expounded by Manu, and incorporated in the "Mánava Dharma Sástra." The positive epoch of this work is undetermined: but it confessedly represents, in its precepts, a state of society considerably anterior to the ultimate date of their collection and committal to writing;[3] while the body of the compilation is assigned, on speculative[4] grounds, to from B. C. 1280 to B. C. 880.

It is a singular and highly suggestive fact that numismatic testimony should have already taught us to look for the site of the chief seat of ancient civilisation in northern India, to the westward of the upper Jumna—a tract, for ages past, relatively impoverished. For such a deduction we have now indirect, but not the less valuable, historical authority, derived in parallel coincidence from the comparative geography of the Vedic period, and from the verbatim text of Manu, the integrity of which seems, for the major part, to have been scrupulously preserved.

3. I trust that European scholars will not imagine that I desire to ignore Megasthenes' statement, that the Indians had "no written laws." (Strabo, xv. c. i. § 53.) This is, indeed, precisely the testimony—seeing the source from whence it was derived—we should expect from what we *now* know of Brahmanical policy. As to the addition "who are ignorant even of writing," this ridiculous assertion had previously been nullified by the more accurate information of Nearchus (Strabo, xv. c. i. § 67), and is further conclusively refuted by the incidental evidence contained in the remarkable passage in the same work, where it is stated, "At the beginning of the new year all the philosophers repair to the king at the gate, and anything useful which they have committed to *writing*, or observed tending to improve the productions of the earth, &c. &c. &c., is then publicly declared." (xv c. i. § 39).

4. Max Muller's "Sanskrit Literature," pp. 61, 62. "The code of Manu is almost the only work in Sanskrit literature which has as yet not been assailed by those who doubt the antiquity of everything Indian."

Professor H. H. Wilson, though hesitating to admit the high antiquity of the entire bulk of the composition, was fully prepared to assign many passages to a date "at least" as early as 800 B.C.—Prinsep's "Essays," i., note, p. 222. See also Professor Wilson's translation of the "Rig Veda Sanhitá," i. p. xlvii.

M. Vivien de St. Martin places Manu under "la période des *temps héroïques*," *i. e.*, between the twelfth and thirteenth centuries B. C., and the Buddhist epoch B C., 543.—"E'tude sur la Géographie et les Populations primitives de l' Inde," Paris, 1859.

The most prolific field among the favoured resorts of our native coin-collectors, in olden time, chanced to be the exact section of the country constituting the *Brahmávarta* of the Hindu lawgiver; and *Thaneswar*—since so celebrated in the annals of the land, as the battle-field of successive contending hosts—contributed, at its local fairs, many of the choicest specimens of the inceptive currencies. In this region the Aryans appear to have almost lost their separate identity, and to have commenced the transitional process of merging their ethnic individuality amid the resident population, though still asserting religious and incidentally political supremacy. Such a state of things seems vividly shadowed forth in the ethnological definitions preserved in Manu; and it may possibly prove to be more than a mere coincidence, that the geographical distribution of the limits of "*Brahmarshi*, as distinguished from *Brahmávarta*," in the same passage, should so nearly be identical with the general boundaries I have already traced, from independent sources, for the spread of the Bactrian alphabet in its Southern course.

I reproduce my latest observations on this subject.

"The Bactrian, Arian, or Arianian alphabet, unlike its southern contemporary, the Indian Páli, has no pretension whatever to an indigenous origination; it would seem to have accompanied or followed, in its archaic and imperfect form, the Aryan immigration from Media, based as it manifestly is upon an alphabet cognate with the Phœnician. We are unable to trace its progressive adaptation from the scanty literal signs of early Semitic writing; as we first find it, in an advanced stage of maturation, in an inscription on the Kapurdigiri rock in the Peshâwar valley (lat. 34° 20′, long. 72° 12′), where it embodies the substance of the edicts of Asoka, whose corresponding manifestoes in the Indian-Páli character are so largely distributed over the continent of India,[5] and the general date of whose incision may be approximatively fixed at 246 B.C.[6]. How much further south this character may have penetrated at this period we have no direct evidence to show, but it is to be remarked that the same king Asoka simultaneously retains the Indian proper alphabet in his monumental inscriptions at Khizrabad[7] and at Khalsi,[8] near the *débouchement*

5. Rock Inscriptions:—1. Girnár, in Guzerat. 2. Khalsi, on the Upper Jumna. 3. Dhauli, in Cuttack. 4. Naugaum, in Ganjam. 5. Bhabra, in Jaipúr.
Monolithic inscriptions:—1. Khizrabad, on the Upper Jumna. 2. Meerut (both moved to Delhi). 3. Allahábád. 4. Rádhia, in Sárun. 5. Mattiah, in the same locality.

6. "Journ. Royal Asiatic Soc," xx. 101; "Prinsep's Essays," ii. 15, *et seq.*

7. "Prinsep's Essays," ii. 324.

8. "Journ. As. Soc. Bengal," 1862, p. 99.

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of the Jumna from the Himalaya range; while the employment of the latter character by Agathocles and Pantaleon would imply its currency within, or proximately south of the province of Arachosia. Then again, certain coins of a kingdom on the Upper Jumna, pertaining to a native dynasty of indeterminate date,[9] but whose epoch may not be very distantly removed from the period under review, are found to be inscribed with the Arian character on the one surface, with a corresponding legend in Indian-Páli on the reverse. In this instance also, the internal evidence would seem to show that the latter was the alphabet of the mint artificers, while the former may reasonably be supposed to have constituted the official writing of the ruling classes. Under this view, it may be conjectured that the Arian palæography encroached upon and intermingled with the indigenous system of letters as the dominant Northern races extended their dominions, in successive waves, further into Hindustan, till the intrusive alphabet reached Mathura, (lat. 27° 30′, long. 77° 45′), which is the lowest point at which any indications of its progress are to be found.[10] Whence, however, it was speedily to be thrown back, and very shortly superseded and extinguished by its more flexible and congruous associate of indigenous growth." (Numismatic Chronicle, 1863, p. 230.[11])

As I have claimed for the Pre-Aryan Indians the independent development of an alphabet specially contrived for, and adapted to, their

9. "Coins of Kunanda, "Ariana Antiqua," pl. xv. fig. 23; "Prinsep's Essays," i. pl. iv. fig. 1 p. 203; Ibid., ii. p. lxix. fig. 16.

10. Mathura *Inscription*, dated in Bactrian figures, "Journ. As. Soc. Bengal," 1861, p. 427; *Coins*, Prinsep's Essays," ii. 197.

11. I recapitulate the leading inscriptions in this alphabet:—1. Hidda (No. 13), near Jellalabad, in Afghánistán. An earthen jar, having an Arian inscription, written *in ink*, and dated in the year 8. "Ariana Antiqua," p. 111, and plate, p. 262. 2. A steatite vase from Bimirán (Jellalabad), with a legend *scratched* on its surface, undated. "Ariana Antiqua," pp. 52, 70, pl. ii. fig. 1; "Prinsep's Essays," i. 107, pl. vi. 3. The Wardak (30 miles W. of Kabul) Brass Vase, now in the India Museum, inscribed with dotted letters, dated in the year 51, and recording the name of Hushka, the OOHPKI of the coins; see "Ariana Antiqua," p. 118; "Prinsep," i. 104, pl. x; "Journ. As. Soc. Bengal," No. iv. of 1861; "Journ, Royal As. Soc.," xx. 37. The Taxila Plate, dated 78, records the name of "Moga," identified with the Moa of the coins; "Num. Chron.," Bactrian List, No xxv. 5. Manikyala Stone Slab (now in the Bibliothèque Impériale, Paris), dated in the year 18, contains the designation of Kanishka; "Prinsep's Essays, i. pl. ix.; "Journ. Royal As. Soc." xx. 251. From the same site was obtained the Brass Cylinder now in the British Museum; "Prinsep," pl. vi. To these may be added two inscriptions from the Yusafzai country, one dated 60; "Journ. As. Soc. Bengal," 1854, p. 705; "Prinsep," i. pl. ix.: and the bi-literal inscription at Kangra (Arian and Indo-Páli), "Prinsep," i. 159, pl. ix.

[The mention of OOHPKI reminds me, that Gen. Cunningham has complained in our Journal, of my having given the credit of the identification of that name with *Hushka*, to another. I have already taken the very earliest opportunity of correcting this unintentional error (Journal Asiatique. Octobre 1863. p. 387.) I availed myself of the same occasion, to express my regret that I, myself, had

own lingual requirements,[12] similarly it can be shown, from as valid internal indications, that they originated, altogether on their own soil, that which has so often proved a nation's unassailable heritage of its indigenous civilisation—a system of weights and measures, which retained its primitive identity in the presence of the dominant exotic nationality. It is indisputable that the intrusive Aryans, at whatever period their advent is to be placed, met and encountered a people, already dwelling in the land, of far higher domestic civilisation and material culture than themselves. Whether their eventual supremacy was due to undiminished northern energy, animal physique, or mental subtlety, does not concern us at present; but independent of the inner-life evidences to that effect, a parallel inference might be drawn from the indirect data of the contrasted tenor of the hymns of the Rig Veda,[13] which while indicating a crude social condition, refer almost exclusively to the country of the Seven Rivers; whereas Manu, at a date but moderately subsequent,[14] associates the far higher progress manifested in the body of the work with a more easterly seat of authority, and while asserting no community with things or people beyond or to the westward of the Saraswati, arrogates for the existing representatives of the Aryans a dominance over kindred kingdoms extending, in the opposite direction, down the Ganges to Kanauj. But, in demanding credence for the simple gift of invention arising out of manifest wants among the already thrice commixed, and in so

failed to do homage for a rectification of his, to which, he, I understand, attaches somewhat of undue importance, that is to say, the substitution of an M. in the place of Prinsep's P, as the third consonant in the name of Toramana (J. A. S. B. vii. 633). It might have been necessary, in early days, to reclaim titles to discoveries made by Lieut. A. Cunningham, (J. A. S. B. 1854, p. 714.) but surely the 'Bays' of the Archæological Surveyor to the Govt. of India can afford to lose a faded leaf with scant damage to the green circlet!]

12. Prinsep's "Essays," London, 1858, ii. 43; Num. Chron., 1863, p. 226.

13. Wilson, "Rig Veda Sanhitá," iii. pp. xviii. xix., London, 1857; Vivien St. Martin, "E'tude sur la Géographie * * * d'après les Hymns Védiques," Paris, 1859, p. 89.

14. "Journal As. Soc. Bengal," 1862, p. 49; Max Müller's "Rig Veda," preface to text, iv. pp. xxv.—xxxiv. "The traditional position of the solstitial points, as recorded in the Jyotisha," is calculated by Archdeacon Pratt to refer to 1181 B.C., and by the Rev. R. Main to 1186 B.C. See also p. lxxxvii. on the subject of Bentley's date, 1424—5 B.C.

For speculative dates concerning the Vedas, see also Max Müller, "Sanskrit Lit." pp. 244, 300, &c.; Wilson, "Rig Veda," i. 47, ii. 1; St. Martin, p. xix.; M. Barthélemy St. Hilaire, *Journal des Savants*, 1861, p. 53; Dr. Martin Haug, "Aitareya Bráhmana," Bombay, 1863; Goldstücker, "Pánini," p. 72, &c.

far improved[15] local inhabitants, as opposed to the Aryan assumption of the introduction of all knowledge, I am by no means prepared to contend that the domiciled races gained nothing in return. The very contact of independently-wrought civilisations, to whatever point each had progressed, could not fail mutually to advantage both one and the other; the question to be asked is, which of the two was best prepared to receive new lights, and to utilise and incorporate the incidental advantages within their own body politic? The obvious result in this case, though denoting the surrender by one nation of all their marked individuality, by no means implies that they did not carry with them their influence, and a powerful one moreover, and affect materially the character of the people among whom, at the end of their wanderings, they introduced a priestly absolutism, which has progressively grown and increased rather than lost power till very recently over all India.

But here again a most important query forces itself upon our consideration. The Aryans are acknowledged to have been in a very barbarous state on their first entry into the land of the *Sapta Sindhu*.[16] It is not known how long a period they consumed in traversing six out of the seven streams, or what opportunities may have been afforded for social improvement during the movement; but even by their own showing in the sacred hymns of the Rig Veda, the Aryans, when they had reached the banks of the Saraswati, were still but very imperfectly civilised. The *Dasyus*, or indigenous races, with whom they came in contact in the Punjaub, may well also have been in a comparatively undeveloped stage of national progress; while the inhabitants of the kingdoms on the Jumna seem to have been far advanced in civil and political refinement.[17] Is it not, therefore, possible,

15. "We have therefore, according to the views just summarily expounded, four separate strata, so to speak, of the population in India:—1. The forest tribes . . . . who may have entered India from the north-east. 2. The Dravidians, who entered India from the north-west . . . . 3. The race of Scythian or non-Arian immigrants from the north-west, whose language afterwards united with the Sanskrit to form the Prakrit dialects of Northern India. 4. The Arian invaders." . . . .—Muir's "Sanskrit Texts," ii. p. 487. See also Caldwell's "Drávidian Grammar."

16. St. Martin, p. 91.

17. Professor Wilson while speaking of the ultimate self-development of the Aryans in the Punjab, remarks, "It [is] indisputable that the Hindus of the *Vaidik* era had attained to an advanced stage of civilisation, little, if at all, dif-

if not probable, that when the Aryan flint, at the end of its course, struck against the Indian steel, sparks were emitted that flashed brightly on the cultivated intellects of a fixed and now thoroughly organised and homogeneous nation, whose leading spirits quickly saw and appreciated the opportunity afforded in the suggestion of a new religion, that was capable of being evolved, by judicious treatment, out of the rude elemental worship, aided forcibly by the mystification of the exotic and clearly superior language of the Aryans, which came so opportunely in company ?[18] The narrow geographical strip, to which the promoters of this creed confined the already arrogant priestly element, intervening between the two nationalities, would seem to savour more of an esoteric intention than of any natural result of conquest or of progressive power, achieved by the settlement of an intellectually higher class. That the Aryans should be able so completely to divest themselves of their national entity and leave no trace behind them, would be singular in itself; but the concentration of all god-like properties on a mere boundary line, so much insisted upon as Brahmanism grew and pushed its forces downwards into the richer countries of Hindustan, while it ignored both the land of the nativity of its votaries and the site of their later more advantageous domestication, forms a fair subject for present speculation and future deliberate investigation. But this in itself is a matter only incidental to my special subject, and I return to the question, that if the Aryans were so far instructed on their first immigration as to bring with them, or subsequently to import and amplify, the Phœnician alphabet, and similarly to secure its transmission, even as a secondary system of

fering from that in which they were found by the Greeks at Alexander's invasion, although no doubt they had not spread so far to the east, and were located chiefly in the Punjáb and along the Indus."—"Rig. Veda," ii. p. xvii. I am inclined to question this latter inference; I do not think the civilisation evidenced in the text of the "Rig Veda" by any means equal to that discovered at the advent of the Greeks; indeed, it would be an anomaly that the Aryans, while occupied in pressing their way onwards, in constant hostility with the local tribes, should have made a proportionately greater progress in national culture than they did in the subsequent six or seven centuries of fixed residence in their new home within the five rivers.

18. A late writer in the *Westminster Review* 1864, p. 154, has justly remarked that the 1026 incoherent hymns of the "Rig Veda" constituted but a poor stock in trade whereon to found a new religion. Nor do the Soma "inspired" Rishis by whom they were "*seen*" appear, from the internal evidence of their crude chants, to have possessed mental qualifications such as should have been equal to the origination of the higher intellectual structure of Brahmanism.

writing, over all the country of the *Brahmarshis*, it would be rash to attempt to place a limit on the amount of Chaldæan or other western sciences that may have accompanied these cursive letters,[19] which, either directly or indirectly, travelled eastward from the borders of Mesopotamia to the banks of the Ganges. And clearly, if the grammarian *Páṇini's* age has been rightly determined by his special modern commentator,[20] Bactrian writing, or *Yavanáni-lipi*,[21] must have been freely current at Taxila at and before B.C. 543, even as it subsequently became the ruling alphabet in those parts, so as to appear as the Inscription character under Asoka (B.C. 246) in the Peshâwar valley, and to hold its own as the official method of expression in concurrence with the local Páli as low down as Mathura up to a much later period. Under these evidences of the spread of Aryan civilisation in India, there will be little or no difficulty in admitting that much of what has hitherto been esteemed as purely indigenous knowledge, may, even thus early, have been improved and matured by the waifs and strays of the discoveries of very distant nations, without in any way detracting from or depreciating the independent originality of local thought, or the true marvels India achieved unaided by foreign teaching.

In illustration of the preceding remarks, and as the necessary definition of the boundaries of the kingdom to which our initial series of coins refer, I transcribe in full a translation of the original passage from Manu.

Manu, ii., 17.[22] "Between the two divine rivers, SARASWATI and DRISHADWATI [Chitang], lies the tract of land which the sages have named BRAHMA'VARTA,

19. We have indirect evidence to show that this style of writing was in very early currency in association with the monumental cuneiform. I assume that wherever, in the ancient sculptures, we see two scribes employed—the one using a style and marking a clay tablet, the other writing upon a flexible substance—the latter is using cursive Babylonian, or what has since been conventionally recognised as Phœnician. M. E. Renan considers it is satisfactorily established, that the Jews used "phénico-babylonien" letters, at their coming out of Egypt, now placed in B. C. 1312. Renan, 'Langues Sémitiques,' pp. 108, 216, &c. Prinsep's Essays, ii. 145.

20. Goldstücker, "*Páṇini*, his place in Sanskrit Literature," London, 1861, pp. 12, 227; so also Alwis, "Páli Grammar," Colombo, 1863, p. xli.; and Colebrooke's "Misc. Essays," ii. p. 4.

21. Max Müller, "Sanskrit Lit.," London, 1859, p. 521; and preface to text of "Rig Veda." London, 1862, vol. iv. p. lxxiv.

22. Sir W. Jones's works, London, 1799, vol. iii.; Haughton, "Hindu Law," p. 22.

because it was frequented by gods.[23] 18. The custom preserved by immemorial tradition in that country, among the four *pure* classes, and among those which are mixed, is called approved usage. 19. KURUKSHETRA [modern Dehli], MATSYA [on the Jumna], PANCHA'LA [*Kanyakubja, Kanauj*], and SURASENA [or Mathurá], form the region called BRAHMARSHI, distinguished from BRAHMA'VARTA. 20. From a *Bráhman* who was born in that country, let all men on earth learn their several usages. 21. That country which lies between HIMAWAT and VINDHYA, to the east of VINASANA [where the Sarasvati disappears in the desert[24]] and to the west of PRAYA'GA [Allahabad], is celebrated by the title of MADHYADESA [or *the central region*]. 22. As far as the eastern and as far as the western oceans, between the two mountains just mentioned, lies the tract which the wise have named ARYA'VARTA [or *inhabited by respectable men*]. 23. That land on which the black antelope naturally grazes is held fit for the performance of sacrifices; but the land of MLECHHAS [or *those who speak barbarously*] differs widely from it. 24. Let the three first classes invariably dwell in those before-mentioned countries; but a SU'DRA, distressed for subsistence, may sojourn wherever he chooses."[25]

It is reasonable to infer that, as a general rule, all schemes of weights among an isolated people, initiating their own social laws, should preferably be based upon some obvious unit of universal access, rather than upon any higher measure of weight, which might naturally result, under authoritative legislation, from progressive increments on the lower basis. So that, in testing the intentional ratios of early times by the extant money designed in accordance with the contemporaneous tables, it will be safer to proceed from the lowest tangible limit of the scale, in preference to accepting any superior denomination as a standard whence to reduce, by division, the component elements involved. The intuitive unit of weight, among an imperfectly formed agricultural community, would naturally be the most generally

23. For the comparative geography of this tract, see Journal As. Soc. Bengal, ii. 106. Major Colvin, vii. 752. ix. 688. Lt. Baker, xiii. 297. Major Mackeson. Elliot's Glossary of Indian Terms, p. 78.

24. Muir, "Sanskrit Texts," ii. pp. 415—418. Wilson, Rig Veda Sanhitá iii. pp. xviii.—xix. St. Martin pp. 15, 73.

25. Mr. Muir has given us a new translation of this celebrated passage, which, as it differs from the above in the introductory portion, I annex in a separate note.

"The tract, fashioned by the gods, which lies between the two divine rivers, Sarasvatí and Drishadvatí, is called Brahmávartta. The usage relating to castes and mixed castes, which has been traditionally received in that country, is called the pure usage. The country of Kurukshetra (in the region of modern Delhi), and of the Matsyas (on the Jumna), Panchálas (in the vicinity of modern Kanauj,) and Súrasenas (in the district of Mathurá), which adjoins Brahmávartta, is the land of the Brahmarshis (divine Rishis)."—"Sanskrit Texts," ii. p. 417.

available and comparatively equable product of nature; in *the form of seeds* of cultivated or other indigenous plants; and in the Indian instance we find, after some definitions of inappreciable lower quantities, the scale commencing with a minute poppy seed, passing on to the several varieties of black and white mustard seed, barley-corns, and centering in that peculiarly Indian product, the *Rati*, or seed of the wild Gunja creeper, *Abrus precatorius* [Sanskrit, *Krishṇala* or *Raktika*], which forms the basis of all local weights, and whose representatives of modern growth still retain their position as adjuncts to every goldsmith's and money-changer's scales. Next to the rati in ascending order comes the *Másha*, which in its universal acceptance has almost achieved the title to be considered as a second unit or ponderable standard, and, as such, its name now primarily signifies "an elementary weight;"[26] but on reverting to its earlier equivalent meanings it would seem that the term, in its original static sense, like the whole of the weights hitherto quoted, referred to another of Nature's gifts, the seed of the Indian-bean *(Phaseolus radiatus,* ماش هندي),[27] which, like the rati, claims especially an Indian habitat as an extensively cultivated plant; and, to complete their associate identities, the bean as at present raised would seem to correspond with the weight assigned to it nearly 3,000 years ago, and to average about the amount of five ratis. The next advance upon the másha is, in the gold table, a *suvarna*, a word meaning *gold* itself, and which probably implies in this case the particular divisional quantity of that metal which in earlier times constituted the conventional piece or lump current in commerce. While the silver increment on the másha is designated by the optional title of *puráṇa*, or *old*, which may be supposed to allude to the, even then, recognition of this measure of value as emanating from high antiquity; and it is precisely the required amount in corresponding ratis of silver incorporated in the earliest extant prototype of coins I am now about to exhibit.[28] The

26. Wilson's "Glossary of Indian Terms," "Másha.... an elementary weight in the system of goldsmiths' and jewellers' weights throughout India, and the basis of the weight of the current silver coin."

27. Wilson's "Sanskrit Dictionary," Calcutta, 1832, *sub voce*, "Masha."

28. J. A. S. B. iv. Plate xxxv. figs. 25—29. Prinsep's Essays, Pl. xx. figs. 25—29 and vol. i. pp. 53, 209, 211. Madras Journal of Lit. and Science, 1858, p. 220. Mr. W. Elliot. These pieces of metal, or "punch coins" as Prinsep named them, average about 52 grains. I have met with one as high as 54 gr. and Mr. W. Elliot gives one at 54·2 gr. Supposing an original Mint issue at 55 grains, the authorized

higher denomination of the silver *Satamána*[29] is also derived from the vegetable kingdom, but unlike the lower divisions, which are defined by single grains, this weight is produced by *one hundred* seeds of the *Alocasia Indica*. When the precise plant, which furnished the Mána seed for the early standard, is satisfactorily determined, the result will doubtless prove the near equivalent of 100 *Mánas* to 320 *Ratis*—which, it will be seen, comprised the identical amount required for the weight of the gold *Nishka*,[30] whose minor constituents are, however, formed upon a different gradational scale, though equally emanating from the conventional *Rati* unit. I need not follow the nomenclature of the larger divisions of weights in the joint tables, but before closing the inquiry I would revert for a moment to the leading point I desire to establish, that the Indians were not indebted to the Aryans for their system of weights; the latter, in fact, when tried by the test of the hymns of the "Rig Veda," would seem to have been very ill versed in the *Flora Indica*, an extensive knowledge of which was clearly necessary for, and is evidenced in, the formation of the scale of proportions. Indeed, although the Vedic Aryans often invoked their gods to aid their agriculture, the result so little availed them that their efforts at cultivation were apparently confined to barley, in the raising of which even they do not seem to have been always successful.[31]

The next question to be examined is the distribution of the arithmetical numbers whereby the process of multiplication was conducted. Mr. Poole has laid it down as a law for Mesopotamian metrology that, "all the older systems are divisible by either 6,000 or 3,600. The 6,000th or 3,600th part of the talent is a divisor of all higher weights and coins, and a multiple of all lower weights and coins, except its ⅔rds."[32]

Rati of Manu's time, would range at 1.71875 grains or allowing 56 grains for the standard, the return of the rati weight would be 56÷32=1.75; an amount I am inclined to adopt upon other grounds. We must not be misled by the more modern weight the rati eventually attained, as it rose, in account, with the rise of *máshas and tolas*.

29. शत मान, Wilson makes it, शत 100, मान measure, See, however, B. मान S. मानक "*Arum Indicum*." Carey, Hort. Ben. pp. 56. 65. Asiatic Res. x. 19. "*Mán Kachú*." Dr. Thomson has sent me a seed of the WILD *Alocasia fallax*, from Khasia, which itself weighs 2½ grains.

30. Nishka occurs in second Ashṭaka of the Rig Veda. Wilson, ii. p. 17.

31. Wilson's "Rig Veda," i. pp. xli., lvii., and iii. p. xi.

32. Mr. Poole has favoured me with the subjoined revised list of ancient metric systems:—

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The sixes and sixties of the banks of the Euphrates[33] find no counterpart to the southward of the Sewalik range beyond the inevitable ten and the included five. The system, like all else pertaining to it, had its own independently devised multiple, the *four*. Whether the first suggestion of this favourite number was derived from the four fingers of the hand, four-footed beasts, or the higher flight of the four elements, we need not pause to inquire, but the Indians have at all times displayed an unprecedented faculty for figures, and were from the first able to manipulate complicated arithmetical problems, and especially delighted in fabulous totals; but with all this they have ever evinced their allegiance to the old 4, which we find in its place of honour in the earliest extant writings and inscriptions. As the nations of the West, to meet their own wants, speedily produced a separate symbol for *five*,[34] and abbreviated the five perpendicular strokes of the Phœnician into <. The Indians, apart from their indigenous Páli signs for 4, simplified the tedious repetition of the four lines the Bactrian writing had brought with it from Mesopotamia into a cross like a Roman X, which was doubled to form eight, while they left the five utterly uncared for, to follow in a measure the original Phœnician method of

	Grains.	Divisional Scale.	Authoritative Unit.	Practical Unit. Coins.
Hebrew Gold (double)	1,320,000	÷ 100 ÷ 100	= 132 gr.	
„ Silver	660,000	÷ 3000 ÷	= 220	220 shekel.
Babylonian (full)	959,040	+ 60 ÷ 120	= 133·2	[126·7] 84·5 siglos.
		or ÷ 60 ÷ 60	= 266·4	
„ lesser	479,520	÷ 60 ÷ 60	= 133·2	
Persian Gold	399,600	÷ 3000	= 133·2	129 Daric.
Egyptian „	840,000	÷ 600 ÷ 10	= 140	140 Ke T.
Æginetan, ...	660,000	÷ 60 ÷ 100	= 110	110
Attic (commercial), ...	598,800	÷ 60 ÷ 100	= 99.8	
„ (lowered), ...	558,900	÷ 60 ÷ 100	= 93·1	92·3
„ (Solonian), ...	430,260	[÷ 120 ÷ 100	= 71·7]	67·5
„ (ditto double), ...	860,520	÷ 60 ÷ 100	= 71·7	71·7
„ (ditto lowered),	405,000	÷ 60 ÷ 100	= 67·5	
Euboïc, ...	387,000	[÷ 6000	= 64·5]	57·0 denarius.

Egyptian Copper.	A.	1400 gr. = 1 Men.	Hebrew Copper.	250 gr.	= ½
	B.	700 „ = 5 Ket.		125 „	= ¼
	C.	280 „ = 2 „		83·3 „	= ⅛
	D.	140 „ = 1 „			
	E.	70 „ = ½ „			

33. Sir H. Rawlinson, "Journal Royal Asiatic Society," xv. p. 217.

34. Gesenius, p. 88; M. Pihan, "Signes de Numération usités chez les Peuples Orientaux," Paris, 1860, p. 167.

IX, or 4 plus 1 = 5.[35] Of course the Indian table of weights had in practice to have its lower proportionate atoms accommodated to the weights actually pertaining to the seeds in each instance, but the higher gradations are uniformly grounded upon fours and tens; and to show how distinctly the idea of working by fours was fixed in the minds of men, we find the gradational system of fines in Manu (viii. 337) progressively stated as "8, 16, 32, 64." So much for the antiquarian evidences, and to prove the custom at the other extreme of the chain of testimony and its survival within a nation of almost Chinese fixity, it may be asserted that the whole vulgar arithmetic is primarily reckoned by *gandas* = "fours," and in the modern bazars of India the unlettered cultivator may frequently be seen having a complicated account demonstrated to him by the aid of a series of *fours*, represented, as the case may be, by cowrie-shells, or grains of pulse. I pass by other elements of calculation, such as the favourite 84 (7 × 12)[36] which might bring me into contest with the astronomers, and content myself with resting this portion of my case on the coincidences already cited, as I conclude the most ardent upholder of Aryan supremacy can hardly arrogate for that ethnic division of the human race any speciality in *fours*.[37]

I now proceed to quote the passage from Manu defining the authorised weights and equivalents of gold and silver, which I have cast into a tabular form as more readily explanatory of the text, and as simplifying the reference to relative scales of proportion.

viii. 131. "Those names of copper, silver, and gold [weights] which are commonly used among men for the purpose of worldly business, I will now comprehensively explain. 132. The very small mote which may be discerned in a sunbeam passing through a lattice is the first of quantities, and men call it a *trasarenu*. 133. Eight of those *trasarenus* are supposed equal in weight to one minute poppy-seed (*likhyá*) three of those seeds are equal to one black mustard-seed (*rája sarshapa*), and three of these last to a white mustard-seed (*gaura-sarshapa*). 134. Six white mustard-seeds are equal to a

35. "Journal Royal Asiatic Society," xix. p. 12.

36. See an admirable essay on this number, under the head of "Chourasee," in Sir H. M. Elliot's "Glossary of Indian Terms," Agra, 1845.

37. M. Pictet, who has so laboriously collected all and everything pertaining to the Aryans, in his "Paléontologie Linguistique," does not even notice the number!—"Les Origines Indo-européennes," Paris, 1863, p. 565.

middle-sized barley-corn *(yava)*, three such barley-corns to one *krishnala* [raktika], five *krishnalas* of gold are one *másha*, and sixteen such *máshas* one *suvarna*. 135. Four *suvarnas* make a *pala*, ten *palas* a *dharana*, but two krishnalas weighed together are considered as one silver máshaka. 136. Sixteen of those máshakas are a silver *dharana*, or *purána*, but a copper *kársha* is known to be a *pana* or *kárshápana*. 137. Ten *dharanas* of silver are known by the name of a *satamána*, and the weight of four suvarnas has also the appellation of a *nishka*."[38]

ANCIENT INDIAN SYSTEM OF WEIGHTS (from Manu, cap. viii. § 134).

SILVER.

2 ratis	=	1 másha.						
32 „	=	16 „	=	1 dharana, or puràna.				
320 „	=	160 „	=	10 „		1 satamána.		

GOLD.

5 ratis	=	1 másha.						
80 „	=	16 „	=	1 suvarna.				
320 „	=	64 „	=	4 „	=	1 pala, or nishka.		
3200 „	=	640 „	=	40 „	=	10 „	=	1 dharana.

COPPER.[39]

Kárshápana.

As there are some obscurities in the detail of the weights given in Manu, I have referred to the next succeeding authority on Hindu law, the Dharma-Sástra of Yájnavalkya, whose date is variously attributed from a period shortly before Vikramáditya, or B.C. 57 to 50 A.D.[40] His tables are nearly identical with those already quoted,[41] one un-

38. "Hindu Law, or the Ordinances of Manu," by G. C. Haughton, London, 1825, and works of Sir W. Jones, London, 1799, vol. iii. Haughton's translation has been modified as above by my friend, Mr. J. Muir.

39. Mr. Muir has communicated to me the following note on the copper weight. "Kullúka Bhatta (the Sanskrit Commentator on Manu) explains that lexicographers declare a *Kárshika* or *Kársha* to be the fourth of a *pala*." But 5 *Krishnalas* or *Raktikas* being equal to a *Másha* and 16 máshas = 1 suvarna, and 4 suvarnas = 1 pala; a pala will equal $5 \times 16 \times 4 = 320$ krishnalas, and a karsha being ¼ of a pala, will equal $^{320}/_{4}{}^{0} = 80$ krishnalas.

40. Lassen, "Ind. Alt.," ii. 374, 470, 510. Dr. Roer, "Yájnavalkya," Calcutta, 1859, p. 11; M. Müller, "Sanskrit Lit.," 330; Stentzler (2nd Cent. A.D.)

41. Sec. 632. Five krisnala berries = 1 másha, 16 máshas = 1 suvarna. Sec. 363. A pala is 4 or 5 suvarnas. Two krishnalas are a silver másha; 16 of the latter a dharana. Sec. 364. A satamána and a pala are each equal to 10 dharanas; a nishka is 4 suvarnas." * * Note. In the corresponding *slokas* of Manu, 10 palas are said to be equivalent to 1 dharana. We can only reconcile this by supposing Manu to refer to a gold pala, and Yájnavalkya to a silver pala. The Sanskrit commentator adds, under *Copper*, 4 kárshas = pala, 1 pana = kársha, *i. e.* ¼ pala.

important but reasonable variant being the assignment of three white mustard seeds instead of six to the barley-corn. There are some apparent contradictions and complications regarding palas and suvarnas, and no additional information respecting the weight of the copper-measure of value, which is described in Dr. Roer's translation as vaguely as in Manu, "a copper pana is of the weight of a kársha," and as the English commentator justly observes, the tables "by no means satisfactorily define the intrinsic weight and signification of the Pana, which as the measure of pecuniary penalty" would naturally be of the greatest importance. It is to be remarked that neither Manu nor Yájnavalkya refer in any way to the Cowrie shell currency, which was clearly in these days a seaboard circulation; nor is any mention made of the tola, which subsequently plays so leading a part in Indian metrology. So much for the weights and their relative proportions *inter se*. I shall defer any examination of the corresponding equivalents in the English standard till I can apply the results to the extant coins of the period.

Before taking leave of this division of the subject, I am anxious to meet, in anticipation, an objection which may possibly strike philologists as hostile to the general position I have sought to maintain in this paper; inasmuch as it may be held that the fact of the several divisions of the static tables being expressed in Sanskrit words, should, *primâ facie*, imply that the Sanskrit-speaking "Aryans" originated the system upon which the gradational scales were based. But it must be remembered that the entire work from whence these data are derived is written in the Sanskrit language, its very exotic character justifying the inference that it was so embodied, not with a view to vulgar use, but for the purposes of a superiorly educated or, more probably, of an exclusive class. Moreover, it is to be borne in mind that the speech itself, though foreign, had for many centuries been partially introduced into the land, and constituted the chosen means of expression of the dominant religious and occasional temporal authority. But apart from these considerations there remains to me the more comprehensive question as to how much of the Sanskrit tongue of our modern dictionaries, at this time undergoing the process of formation and maturation on Indian soil, was indebted to the local speech? It can be shown from sound palæographic, as well as from philological testimony, that the intermingling Aryans borrowed Drávidian letters to improve

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their *then* imperfect alphabet,[42] adopted Drávidian words till lately classed as Aryan,[43] and as we have seen, by the inherent evidence of the Bactrian character, appropriated a very large amount of Indian Páli design in the mechanical construction of the vocalic and other portions of their needfully amplified Semitic writing.[44]

I had written thus far, with growing doubts about the universality of the Indo-Germanic speech in India, when it occurred to me to inquire if Drávidian roots might not throw light upon the clearly misunderstood meaning of the passage in Manu, defining the value of a copper *kárshápana*. The result has more than answered my expectations, as I find the Tamil *kásu*,[45] corruptly "*cash*," described as "coin, money in general," and among the details it is mentioned that *ponakásu*, *vennikásu*, and *pettalaikásu* still exist as the vernacular terms severally for gold, silver, and copper *coins*, while the corresponding verb *kásaḍikka* primarily means "to coin." With these hints a new and intelligible translation of the verse कार्षापणस्तु विज्ञेयस्तात्त्विकः कार्षिकः पणः may be proposed, to the effect that a "*kárshápana* is to be understood (to be) a *coined* copper *pana*." If this interpretation will stand criticism, we have indeed the new phase of the Indian monetary system, that the earliest Sanskrit authority on such subjects extant, dating between 1280 and 880 B.C., recognises as an ordinary fact the institution of *coined* money, while the context proves how much of Drávidian civilisation still remained in the Upper Provinces, and how little competent subsequent Sanskrit commentators on Manu's text were to appreciate anything beyond their own confined views and conventional teachings.

42. Norris, R. A. S., xv. p. 19. "The Scythic Version of the Behistun Inscription of Darius," Caldwell, "Drávidian Grammar," pp. 43, 107, 111; Prinsep's "Essays," ii. 151.
43. Caldwell, p. 438; Muir, "Sanskrit Texts," ii. p. 440.
44. Num. Chron., 1863, p. 232; Prinsep's "Essays," ii. 146.
45. Wilson, "Glossary of Indian Terms," *sub voce*.

On the Language of the Sí-áh-pos'h Káfirs, with a short list of words; to which are added specimens of the Kohistáni, and other dialects spoken on the northern border of Afghánistán, &c.—By Captain H. G. Raverty, *3rd Regiment, Bombay N. I.*

In the beginning of the year 1859, some time after my paper entitled "Notes on Káfiristán" had been submitted to the Society, but previous to its appearance in the Journal,* the Rev. Dr. E. Trumpp, of the Church Missionary Society, residing, at that time, within the cantonment of Pes'háwar, was allowed to examine, through the Commissioner of that district, three men, said to have been of the Káfir race—that is to say, what we call the Sí'ah-pos'*h* Káfirs—who had been brought to the district from Panj-korah or its neighbouring hilly tracts, for the purpose of being enlisted into the British service.

These three men remained at Pes'háwar for "a few days," during "three or four hours" of which Dr. Trumpp examined them, through a man named Muhammad Rasúl, a Kohistáni of "Panjkore" as the Doctor terms it, but correctly, Panj-korah.† This man, who was not an Afghán, since the Doctor calls him a "Kúhistáni," "spoke Pushto and a little Persian," and acted as interpreter between the Missionary and the so-called Káfirs; and from this short and round-about conference, a short grammar of the language has been made, and a list of seventy-seven Káfir words appended.

It is not my object to criticise the former at present, but to give a list of Káfir words, which I collected some years since, and which I intended to have given with my "Notes on Káfiristán." To these words, for the sake of facilitating comparison, I have also added some Kohistáni words, which I collected about the same time, together with a few in the Pashai, Bárakai, Ḳásh-ḳárí or Chitrálí, and Belúchkí languages. I would have given the Pus'hto equivalents of these had space permitted, but they may be easily found in my Dictionary of the language, together with the other words, of which there are often more than one, bearing the same signification.

From what is stated respecting the appearance of these three men, that "they were in all respects like the natives of the upper provinces of India, of a swarthy colour, with dark hair and dark eyes," I should

* No. 4 of 1859.

† See my paper on Panj-korah in the last number of the Journal.

hardly think they were real Káfirs; and should consider that, in all probability, they were *nímchahs* (نیم‌چہ) or "half-breeds," as those people are designated who have sprung from the mixture of Afgháns with the aborigines of the parts to the north of the Kábul river; viz. the Káfirs, Lamghánís, Shalmánís, Deggauns, Gújars, Suwátis, &c., and with each other; for the Afgháns, as we know from their histories, as well as from the accounts of Persian and Hindústání writers, have been in the habit of applying the Arabic term "Káfir," or "Infidel" very indiscriminately, particularly to the aboriginal people of Afghánistán bordering upon the Kábul river and its tributaries, and the people of the Alpine Panjáb nearest the Indus. Hence, with them, the term Káfir might as well refer to the Lamghánís, or Shalmánís, before conversion to their own faith, as to the people whom we know by the name of Sí-áh-pos'*h* Káfirs. Lieut. Wood, when on his journey to the source of the Oxus, passed close to their frontier, and he, moreover, saw and conversed with Sí-áh-pos'*h* Káfirs (for they are friendly with the people of Bádakhshán), and he describes them as being very different to the "swarthy coloured people of the upper provinces of India, with dark hair and dark eyes," such as Dr. Trumpp speaks of.* What makes me think that these three men could not have been real Sí-áh-pos'*h* Káfirs, is the fact of their having come to Pes'háwar otherwise than as slaves. Both males and females—the latter in particular, on account of their fair complexions and beauty—are to be found in the dwellings of the Afgháns of the better class, in the *Samáh* of the Yúsufzís, but they are always slaves; and some will be found in the Pes'háwar district also; but they are very different to those the Missionary describes. The Sí-áh-pos'*h* Káfirs, are too hostile to, and hate the Afgháns and other Muhammadans of those parts too much (except perhaps the people of Badakhshán, as already mentioned), to meet them, or to enter their boundaries, save as enemies, or when, as slaves, they are compelled to do so. If these men were not actually Nímchahs or Kohistánís, of which, I have little doubt, they may possibly have been Báris—a certain class or tribe among the Sí-áh-pos'*h*, who are held in the light of Páriahs. An account of these will be found at page 36 of my "Notes on Káfiristán" already referred to; but if the Kohistání words I have given be exa-

* Dr. Bellew also met Káfirs when in Afghánistán in 1857. See his excellent work.

mined, and compared with the short list given by the Missionary, it will be found that what he terms Káfir, are the same words as my Kohistání, with but slight exception; whilst what I term Káfir agree with the list (as far as it goes) given by Sir A. Burnes in the Society's Journal for April 1838, and are synonymous with those given by Mr. Norris (the Honorary Secretary of the Royal Asiatic Society) as an appendix to Dr. Trumpp's paper,* which were procured at Teheran from a Káfir woman residing in that city.

The Doctor says he "was very desirous to know by what name they called their own country, as Káfiristán is a mere Muhammadan appellation;" and that "the name they gave for their country was *Wámasthán*, a word, as I found, known to the Kúhistánís too, who designated it by what is called in Persian Kúhistán, or the *highlands*."† He then proceeds to give, or rather to *make out* a signification for the word, and applies it to the whole tract forming the culminating ridges of Hindú Kush, as far west as Bálkh, in as plausible a manner as the "*Heydiddlediddlethecatinthefiddle*" inscription is edited and translated in one of the early numbers of Fraser's Magazine for the present year. He will find, however, that there is a tribe of Sí-áh-pos'*h* Káfirs called by the name of Wámah, and one of their villages is so named. An account of them and their district will be found in my paper.

Dr. Trumpp states, at pages 5—7 of his article, that the Káfir language, like the Pus'hto, has a short indistinct (?) vowel sound approaching the English *u* in *but*, or the German *ü*; and that "it is not given in my Pus'hto Grammar (1st Ed.) though well known and even marked out by the natives themselves." He then goes on to say, a few paragraphs further on, that he "first mistook this sound for a short *i*, but soon found that it was a peculiar swift *a*, or in fact an indistinct vowel between short *a* and short *i*." He then states, that "the sound of Káfir *a* can only be compared to the peculiar indistinct sound in Pus'hto; as اُوږه سَړُي (mas.) and اُوږه شَځه (fem.), which can only be learnt by hearing." To what sound in these four

* "On the Language of the so-called Káfirs of the Indian Caucasus.—By the Rev. Ernest Trumpp, D. Phil., Missionary of the Church Missionary Society." Journal of Royal Asiatic Society, Vol. XIX. for 1861.

† The word "Kohistán" is applied to all mountain tracts by the people of these parts—there is the Kohistán of Kábul, the Kohistán to the north of the Suwát river, &c., and not to "Kooner" only, as the Doctor calls it (*Kunar* he means).

words does he refer? to the first word, or the second; to the beginning, middle, or termination of these words? The explanation he gives will, I am sure, be perfectly unintelligible to all who do not happen to understand Pus'hto thoroughly; I think I can clear up the point. The Missionary refers, no doubt, to the adjective اُوږد which takes a different sound before the final consonant for masculine and feminine nouns; and this peculiar vowel sound only occurs, either in the case of nouns, adjectives, and verbs, before the final consonant of a word. It will be found fully explained in my Grammar, in the declensions of nouns, in the word غل "*ghal*" a thief; in the word سخوند "*skhwandar*" a steer, in the fifth variety of nouns of the 6th Declension; in the terminations of adjectives of the same class; and in the terminations of some verbs. I have always written it, in the second edition of my Grammar, as explained by the Afghán author of the "ÆJAIB-UL-LUGHAT"* gives it; *viz.*, as a compound sound of short *a* and *i*. Thus in the example which Dr. Trumpp gives (which, in fact, is no example at all, since he places the short vowel point (ـَ) —"*a*"—over both the adjectives he uses), the first should be written اُوږُد *(ú-dæh)* (mas.) and the second اُوږَد *ú-dah* (fem.). In the work just quoted, the author states,—"The word اغلے is an example of this peculiar sound. When written with simple *r*, *á*, quiescent *gh*, *l* with the short vowel *a*, and unaspirated *h*, or "*há-i-khafí*," it is the third person feminine singular—"she goes;" and when written with simple *r*, *á*, quiescent *gh*, *l*, *with a short vowel approaching, to a and i slightly sounded*, and unaspirated *h*, it is the third person masculine plural." These are the exact words of the author as I have given them in my Grammar. The vowel (ـَ) *(fat'hah)* with (ء) *(hamzáh)* combined —ـَء=(æ) give an equivalent sound, as near as possible, which I have therefore adopted. It will be found written thus in the same manner in my Pus'hto Dictionary, in scores of words. The Afgháns, of course, mark it in speaking; but in writing they do not mark it: it is supposed, that a person acquainted with the rules of the language will read and understand it accordingly.

I may mention, that the Doctor has made some considerable errors with regard to the Pus'hto examples he has given. In the words اُوږَد سَړُي and اُوږَد شَخه for example. By the word سَړُي he evidently means a man; but if so, the letter ړ is not correct: it should

* See my Grammar, Introduction, pages 34 and 84.

be Afghán سَرِي = ږ The word for woman should be with Afghán ښ not with Persian ش and with *fat'ha'h* (-) not with *kasráh* (ِ)—ښځه, not ښځه. The pronunciation according to the Doctor's account would be *shidzah*, whilst the Afghán pronunciation is, *k'hadza*'h by the Eastern, and *s'hadza*'h by the Western tribes, the peculiar Afghán letter ښ being widely different from Persian ش.

He considers the Káfir language to be "a *pure Prákrit dialect*;" yet, a few pages further on, he says:—"Note.—I have not been able to come to any conclusion in regard to the *gender of nouns*. I doubt greatly if any gender be distinguished, as I have not been able to find out any trace of it. So much is clear, that adjectives are not subject to any change, either in regard to *gender* or *case*." If such be the fact, how can the Káfir language possibly be a "*pure Prákrit dialect?*"

With reference to the Pashai and Bárakai words which follow, I may mention, that the Pashai language is spoken by the people of that name, who inhabit some of the small districts of the hilly country bordering Káfiristán on the south-west, and on the left, or northern bank of the Kábul river, between Jellálábád and Kabul. The Pashais are counted among the aboriginal people of the country, which the Afgháns are not.

The Bárakais, who are not Afgháns, are included among the people termed Tájíks (supposed to be of Arab descent,) dwell at, and round about Káníigoram, as we generally find it written in English, but properly, Kání-grám, and about Bárak in the province of Loghar, and But-Khák on the route between Jellálábád and Kábul, south of the river of that name.

I shall say nothing here about comparison of the words which follow, although I recognize a great many. It would be unfair towards that class of philosophers called "Comparative Philologists," who, if they set to work, may discover something wonderful among them, which none but themselves can understand.

It is necessary to say a few words respecting the orthography. The system is the same as used in my Pus'hto works; viz. that known as Sir William Jones's. The only difference is for the peculiar sounds similar to the Afghán letters, viz; ḍḍ for ډ, *rr* for ړ and *s'h* and *k'h* for ښ

English.	Sí-áh-pos'*h*.	Kohistání.	Pashai.	Bárakai.	Belúchkí.	Ḳásh-ḳárí.
A man	man-chí	ádam	paṇ-jai	sadaiki	mard	rng
A woman	is-*tt*ri	áo-rat, is*tt*rí	zá-íf		zál	kumrí
Father	tah-lah	bá-wah	tá-tai	dadai	áyá	
Mother	no-rrú	á-e	á'i, pulttem	máw	a-ya'í	
Brother	burá		lá-yá	marzá	barás	
Sister	sús	sahal	sá-yá	khwár	ghúwár	
Boy	á-jistah	bál-katú	bálákúl	kalának	chuhwaro [kah	duk
Girl	jík	j*á*g*h*-kaṭe	wá-yá, lawṇí	zarigay	chuhwarį or jan-	kumeru
Grandfather	wá-wa	bu*dd*an-bá-wah		bábá	ná-ná	
Grandmother	wá-wai	bu*dd*an-á-e			ná-ní	
Mother-in-law	chach-hí				zálus	
Father-in-law	sú-sur	*sh*ahír			wasarg	
Son-in-law	za-má	jámai				
Male, Female } Horse	wú, is*tt*rí } usp	*dd*ír, is*tt*rí } gorú	ghoddá	yásp	zá-yan	as-tor
Bullock	gáo	kuláuk	addá (m.), gá (f.)	nar-go'e (cow,), mád-go'e	khá-yar	leshú
Cow	is*tt*rí-gáo					
Camel	us*h*-túr	us*h*tur		úgh	lerro	
Ass	nít	kúr	khartá (m.), khartí (f.)	khar	lá-ka, buz	
Goat	u-sah	pújs	so-ata (m.), phá-jaddik (f.)	bak-rí		
Sheep	mushal	barú		barátá (m.), baráttik (f.)	ridd	
Lamb	barrú	duknú			gor-ándd	
A pig or hog	iánu-rú	súr			sú-ar	
A cat	sh'pash	pa*sh*ak	únddarik		billí	
A kid	palámí				pahohar, pahash	

Fish	masih	mut'h	máchh	má-hí	machhí	
A sparrow	man-gusht	pichin			churi	
A partridge	jzú	jzu-wai		kouk		
Crane	shin	shin				
A crow	koruk	kaika			gurágh	
A deer	shirdú (m.)	sarú	táddá	á-hú	á-sak	
A roe	marrah (f.)		leddhî			
A jackal	walaey	shúl-ttí	lawich		tuholagh	
An otter	húl	húl				
A fox	ál-wakí	lambá-hí				
A rat	mishak	músh			mushak	
A hawk	busín	warandú juro			báz	
A falcon	ash-lak	boz				
A bear	rích	unch		khirs		
The sun	ṣú	sir		toawî	rawsh	
The moon	más		máo	mar-wokh	máh	
Rain	wesha	dámún	wágh	bárán	hor	
A cloud	ná-rú, mai-ár	ttúnak	abalî		juhratt	
Day	karah-yáo	jai	dewás	rosh	rosh	
Night	rad-ár	wila	wyál	gha	shaf	
Morning	dil-kín	sahar				
Evening	trim-shí	trim-shihí			namá-shám	
Great	jisht-rú	jishttarú	bákuttá, gandd	sturra		hut
Little, small	achah-tú	sitah-lú	chonṭá, kam	zari		tsyuk
Snow	zaim	sim	ím		babar	
Hail		á-shin	asal			
Stone	wátt	zúm	wádd	gap		
Clod of earth	umúrrey	dukú				
Mud	ám-rrey	shu-lú	silá			
Earth, dust	palál	pú			daz	
Sand	wátt-palál	sihel				
Wood	ddáw	dúr	dár	gon	dár	
Fire	alah-angáo	ingwur	an-gár	aron	ás	ág
Water	a-wi	wuruk	wark	wokh	áf	augr

English.	Sí-áh-pos'*h*.	Kohistání.	Pa*sh*ai.	Bárakai.	Belú*ch*ki.	Ḳásh-ḳárí.
Bread	phayásh	áh-ú	aú	waro*sh*t		
Milk	zú	*ch*ír	*ch*ír	pika*kh*		*ch*ír
Butter	nú-hey	núní	núnú	maská		
Clarified butter	anaw	kost		ruṇ		
Rice (husked)	ka*sh*r	í-*sh*úl		w'rizza	*ch*áwal	
Wheat	gúm	gúm	gom	ganum		
Barley	árr-pas	*j*zú		speg		
Pulse	mo*sh*	mú*sh*				
Bean or pea	síw	síw				
Coagulated milk	*ch*er	jú*gh*rút	chír	*gh*ip		
Butter-milk	niwah	kar-wú				
Kind of cheese	k'rút	k'rút				
Carpet	zane-*j*zúwo	zilím			gilim	
Felt (cloth)	pilás	namad				
Fowl	ki-khar	kukur		kirji	wángá	
Duck		mur*gh*-áwí				
Kite		mu*sh*-ddá			hil	
Hare		*ch*úsak			khar-go*sh*	
Quail		*sh*uyúl				
Lip		úsh-ttú	dúr	lab		
Breast		sinú	sina	siná		
Shoulder		*ch*ika				
Hand	*ch*apálpain	ás-tún				hast
Foot	kur	poe	pá			pong
A year		kúl			sál	
Hail		a*sh*ín				
Charcoal		askawúr				
A dog	tún	*sh*únak				
Frog		moku				
God	dogham					
Thunder	trankias					

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Hill	dá						
Plain	galúlah						
Shade		sayá				már	
A snake	kúzuth	kunthú				za-yam	
A scorpion	ttamú	ttattwí					
Hair	jai, jaey	chuhúl	*chál*	diri			uch
Head	*sháhái*	*shír*, kapal	sar	sar		bur-mán	maskar
Eyebrow	*ajz*-brú	*ajz*-brú				*chaham*	dirau
Eye	ún-chey	achí	*anch*	*tsimey*			
Nose	nasúr	nushutt	nást	není			
Mouth	dáw	kulun	dán	*gísh*ey			khur
Tooth	dund	ddanda	jib				
Tongue	dísa	jzip	*khád*	go'i		gardin	
Ear	gur	kuhí	mandá				
Neck	gurga	mandaw	*kúch*	nas		náfug	
Belly, stomach	kitsal	*kuch*				khír	
Navel	*u*-wú	o-wú					
Penis	*shárat*t	kan-gún				khus	
Testicle	andd	landdí					
Puden. muliebre	parrí	*jzára*		*push*t		phush*t*	
Anus	pirrá-í	kahin	náwad				
The back	pittí	dúr	dúr				
Face	meg	pirán		*mak*h	(also the [cheek])	á-gey	
Before, in front	pech	pachúta	pachaddá	papets			
Behind, in rear	pittrrey		gul				sin
River	á-ley						
Rivulet, spring	parey						
Pond, lake	kár-maley, kár-ttley						
Bridge (of a river)	kattith, gárrntsey						
Bridge (of a brook)	sewarah						
Lake	nil		kán			ther	wy-*shú*
Arrow	*shattí*, siá-hí		lún-tá			kahwán	drun
Bow	dur-úey						
Bow-string	wálí						

English.	Sí-áh-pos'*h*.	Kohistáni.	Pa*sh*ai.	Bárakai.	Belú*ch*ki.	Ḳás*h*-ḳárí.
A feather	pút					
Grape	dirá*th*		da*sh*ik	an-gúr	darákah	durut
Apple	párrurra		ma*rr*ne			
Peach	á-rrú					
Pomegranate	árr-mú		amirik	anár	anár	
A sloe	am-lúkey					
The jujube	kú-mú				æunnáb	
Quince	bihí		baho			
Apricot	sirah		a*sh*a*dd*i			
Mulberry	kink-lík		wirambú			
Walnut	link					
Almond	lúttí					
Red	ziney		símek	sú-g*h*a	suhar	
Yellow	zú-*ch*árwah		pelá	ze*dd*	zard	
White	ka*sh*rey		*sh*lek	ispenk	sawes	
Black	*j*zey		sámek	*gh*arása	sí-áh	
Green	sú*th*		alíná	*sh*in	sabz	
Mountain	ga*rr*ah			girí		un
Forest	kándú					jungal
Tree	ka*tt*ah, u*sh*tun		ka*dd*í	dara*kh*t		kun
Flower	gulah		pinjá			gulah
Thorn	palaw	*sh*úlah				
Narcissus	*sh*a*rr*í					
Unhusked rice	*sh*álí	*sh*úl				
Maize	ju-ár	ju-ár			juwár	
Blanket (of wool or hair)	buzey	*dditt*				
Fine cotton cloth	púj	páwuk				
Cotton	bijrík	pa*ch*áiy	pa*ch*	pambah		
Thread or yarn (silk or cotton)	pi*ch*ij	súnú			bandí*kh*	

A needle	*ch*ilam *ch*í		súchak		*sh*iya-*sh*í-án	
Hair thread (or rope?)	jsiwey minah	jzitardáley				
Rope, cord, twine	minah	damatú				
A (tent) peg	kúl	kel			meh	
Wool	upáme-*jz*ey	barah-*jzútt*	yúl	wadai		[*Imp.*
Goat's hair	usah-*jz*ey	*ch*arú-*jzútt*				(v.) hai, ir-ageh
Come (v.)	áne-usan	yá	minai	radzai		(v.) barai, barai-
Go (v.)	usan		irrtai	tso		[bog*h*o *Imp.*
Came	iw-zih	*áth-ith*				
Went	gahey	guwai				
Seize	*dd*um	kurah		nassa, ú-ra		guneh
Give	pil	wá		*sh*era		mula-det (give
Bring				ráw-*rr*a		[me?
Look	wi*rr*ah	dí-á				po*sh*ik (v. ?)
Eat	íw	*jz*ú				po*sh*ik
Don't eat	na-yamú	má-*jz*ú				juwak
Strike	wela	an		*dz*ana		
Don't strike	na-wela	má-an				
Don't come	na-usan					
Sit down	ni*sh*il		nepá	neh		
Don't sit	na-ni*sh*íl					
Rise up	a-í		ura	hast		
Do not rise	na-a-í					
Eaten up	yá-*sh*ey					
He eats	ae-yá*sh*ey					
He will eat	kája-yá*sh*ey					
He will not eat	nah yá*sh*ey					
Why does he not eat?	ká nah yá*sh*ey					
Killed	jiníá					
Is killed	jiníá-ka					
He kills	*dd*emú					
Kill you	ch'm-run					
Why did he kill?	kánje jiníá					

English.	Si-áh-pos'*h*.	Kásh-ḳárí.	Kohistání.
Sword	tar-wálí	kongur	
Iron			*ch*amún
Axe	*ch*a-wí		wáttí
Shield	karai	huri	
Soldier	as-tah		
Chief	sal-mana*sh*		
Troop	kat-kai		
Wall	bar-kán		
Matchlock			to-bá*kh*

Some Persian Inscriptions found in Srinagar, Kashmír.—By the late Rev. I. Loewenthal.

I. The Mosque of Shahi Hamadán.

As the traveller glides up the placid Jelum from Báramula, and passes under the cedarn bridges of Srinagar, wondering at the tall, gable-roofed, many-storied houses on the banks, with their unoriental profusion of windows, his attention is arrested by a curious building on the right bank between the Fateh Kadal and the Zaina Kadal (bridges), which, if he enters Kashmir from the west, he will not readily guess to be a mosque, having probably passed by unnoticed similar buildings at Shádarra and Báramula. The pyramidal roof, broken into three equal portions, ending in a most curious steeple resembling a belfry, with gilt bell and heart-shaped ornaments at the top, the four corners of the roof adorned by wood tassels, the projection of the roof beyond the walls of the building;—all this reminds one more of a Chinese pagoda than of a Mohamedan place of prayer. The impression one receives from the structure leads to the idea that the period of the erection of the building may have been one in which an older form of building, that of the Hindu temple peculiar to the valley, was still influencing the architects to whom Mohamedanism was as yet comparatively new.

The building may be said to be constructed entirely of wood. Massive beams of the indestructible Himalayan cedar placed upon one another, the interstices being filled up by small bricks, form a solid square whose sides are relieved by well-proportioned balconies in the upper story, the floors and roofs of which are supported by light and graceful carved wooden pillars.

Curious as is the appearance of the building, its history seems as curious. At every turn in Kashmir one meets with evidences of the policy of the Mohamedans to turn idol-temples into mosques, tombs, and shrines. This place is an instance. There was on that spot a famous spring sacred to Káli with (probably) buildings over and around it. Sikandar called Butshikan (idol-breaker), the grandson of the first Mohamedan king of Kashmir, built the present structure with the rich property belonging to the Hindu temple, as a خانقاه for the numerous Sayids who are said to have come into the country with Sháhi Hamadán, and who were adopting a monastic form of life. After the death of Sháhi Hamadán, a shrine in his memory was erected over the very spot where formerly the sacred spring welled up. It is not uninteresting to compare with this the practice of other countries, such as the tradition which existed in Rome concerning the sacred well under the Capitol, and that under the temple of Apollo at Delphi; of the fact that in the time of Hadrian a temple of Jupiter-Serapis was erected on the place of the crucifixion, and one sacred to Venus-Astarte over the real Holy Sepulchre.

For five centuries now have the Mohamedans of Kashmir been in possession of this spot consecrated to the memory of the Hamadán Sayid. Shall any one dispute their right to hold it now? Yes. The Hindus of Kashmir—they are almost all Brahmans—whatever else they have forgotten of the history of their country, have not forgotten this spring of Káli. The Dharm Ráj—the rule of a Hindu king—has been restored to them; the present ruler moreover is a *devout* Hindu; and they are claiming their sacred spring. Twice already have the Mohamedans had to redeem their shrine, but this has not saved them from a great indignity. On the wall fronting the river, which wall really belongs to the mosque, the Brahmans have put a large red ochre mark as the symbol of Káli, and Hindus may be seen rubbing their foreheads and employing the forms of idolatry but a step or two

from the spot where the Mohamedan is now only allowed to whisper: "God is great!"

The news that a Mohamedan had usurped the throne of Kashmir reaching the countries to the West caused a large influx of Sayids and other holy characters into Kashmir. Mír Sayid Alí Hamadání, subsequently known as Sháhi Hamadán, came to Kashmir a *number of times*. This consideration reconciles the discrepant statements of the native historians that he came from Bokhara, that he came direct from Hamadán in Persia, and that he came from Baghdad. Bírbar Paṇdit Káchrú states that he came to Kashmir in 782 H. (A. D. 1380) for the third time. This date appears to be more correct than that given by Captain Newall in the Journal for 1854, p. 414. He mentions, on native authority, the year 790 H. (1388) as the date of his *first* arrival apparently. This cannot be true, if the inscription over the door of the mosque Sháhi Hamadán is correct, which gives as the date of his *death* the year 786 H. (1384). There is, however, great confusion in all the dates of Kashmirian history. Thus, Captain Newall, on the authority of Kashmiri historians, places the first usurpation by a Mohamedan of legal power in Kashmir in 1341, whilst Baron Hügel, following Abul Fazl, mentions 1311 as the year of Shamsuddín's accession to the throne. Haidar Malik Chadwaria gives the titles of two books, the شمهٔ منطق and the شرح سراجي, which the Sayid wrote at the request of Sikandar Butshikan. He died, during one of his journeys, in Pakli, a beautiful valley now belonging to the British district of Hazára. There is a mysterious-looking structure about halfway between Abbottabad and Mánsihra, which we may, in default of any information concerning it, fix upon as the tomb of Sháhi Hamadán.

The readiness with which a people forcibly severed from idolatry passes over to hagiolatry, may be seen from three inscriptions at the entrance of the mosque of Sháhi Hamadán, copies of which are subjoined.

1. Large letters on a ground of gold.

هر فيض كه در صُبقهٔ هر دو جهان است
در پيروئي حضرت شاه همدان است
شاه همدان بلكه شهنشاه جهان است
اي خاك بران ديده كه در ريب وگمان است

Translation.

Every advantage existing before either world
Is obtained by the followers of Hazrat Sháh of Hamadán;
Sháh (king) of Hamadán, or rather Sháhansháh (emperor) of the world.
A curse on the eye which looks on with doubt and suspicion!

2. In Arabic characters on a ground of gold.

تاريخ وفات وي

چو شد از گاه احمد خاتم دين زهجرت هفتصد وسته وثمانين
برفت از عالم فاني بباقي امير هر دو عالم آل ياسين

Translation.

Date of his death.

In the year 786 from the time of Ahmad, the seal of religion (that is) from the Hijra, there went from the transitory to the eternal world the prince of both worlds, the descendant of Yásín.

Note. "The descendant of Yásín," آل یا سین, a curious expression to denote the descendants of the prophet. *Yá Sín* یاسین is the name of the thirty-sixth Sura of the Koran, which is so called from the fact that these two letters mysteriously stand at its head. Their meaning is uncertain. The Sura itself is considered particularly sacred by the Mohamedans, and is read by them over dying persons: they say that Mohamed called it "the heart of the Koran."

3. Inscription in crimson characters.

ایدل اگرت مطلب فیض دوجهانست رو بر در شاهنشهٔ شاه همدانست
مقرون اجابت ز در اوست دعا را عرش است درش بلکه از و عرش نشانست

Translation.

Oh heart, if thou desirest the benefit of both worlds,
Go, it is at the gate of the emperor Sháh of Hamadán.
At his gate prayer obtains an answer;
His gate is the heavenly pavilion; nay, the pavilion is a type of it.

II. The Tomb of Zainul'ábidín.

Some little distance from the Sháhi Hamadán mosque down the bank of the river there are some remarkable massive remains of the outer wall of a Hindu temple—mentioned by Col. Cunningham in his Essay on the Aryan Style of Architecture—with its trefoil arches and sculptured Hindu divinities. The temple itself disappeared before the fanatical zeal of the early Mohamedan kings, and the inner space was

converted into a graveyard for royalty. There is only one *large* tomb (or rather the ruins of one) in this inclosure, and this is said to be the tomb of Zainul'ábidín, called Jaina-laba-dína in the Sanskrit history of Kashmir which forms the sequel to the Raja Tarangini. The tomb somewhat resembles in its general outlines, though on a much smaller scale, that of Anárkalí at Lahor. It is now used as a Government granary. It is surrounded by a large number of smaller tombs. Over a postern gate there is the following inscription:

در زیارت روضهٔ اجداد خود سلطان حبیب
دیدوگفت این جای شاهان تنگ گردد عنقریب
صفه و دروازهٔ دیگر بپهلویش فزود
تا ازین روضه نگردد هیچ شاهی بي نصیب
گاه تعمیر بنای نو شنیدم از سروش
سال تاریخش مزار ثاني سلطان حبیب

Translation.

On visiting the sepulchre of his forefathers, Sultán Habíb
Saw it and said: This royal place will soon become too narrow.
He erected another daïs and door by its side,
So that no king might fail of the blessing of this Sepulchre.
At the time of erecting the new building I heard by inspiration
The year of its date: "The second sepulchre of Sultán Habíb"—981.

Note. This date also evinces the uncertainty of the dates in Kashmirian history; for according to Captain Newall (A Sketch of the Mohammedan History of Cashmere, J. A. S. 1854, p. 426.) Habíb was killed long before this date, in A. D. 1557. The native historians, at all events, put his deposition nearly twenty years before the date of the inscription. Narayan Kol states that Habíb Khán became king of Kashmir in H. 960. In 961 he committed great mistakes in the administration of justice, so that the pillars of the state became ashamed of him. Hence Alí Khan put the crown on the head of Ghází Khan, his brother (both being uncles of Habíb by his mother's side); this was the beginning of the Chak dynaty. Hügel gives Chak as an abbreviation of Chaghatai. 'Azam, another historian of Kashmir, puts the beginning of the Chak dynasty in the year H. 962; he calls Habíb the son of Ismaíl Sháh, whilst Narayan Kol gives Shamsuddín (Ismaíl's brother) as the name of his father.

In a corner of this same graveyard there is a large slab with an inscription which is remarkable as being connected with the first recorded visit of an Indian Officer to the valley of Kashmir.

Inscription.

میرزا حیدر کورگان ابن میرزا محمدحسین کورگان ونواسه یونس خان خانه زادهٔ بابر پادشاه وبزنه ابو سعید خان بادشاه یارکند و مغلوستان این یونس خان مذکور از اولاد توغلوق تیمور خان از نسل چغتائي این چنگیز خان مولد میرزا وقت محمود سال نهصدوپنج ۹۰۵ درشهر اوراتبه و بعد تصاریف زمان بحکم ابو سعید خان از یارکند برآمدهٔ پس از تسخیر تبت درهمان سال باچهار هزار سوار بتاریخ روز چهارم ازماه شعبان سنه ۹۳۵ فتح کشمیر کردهٔ باز بمحمد شاه که بادشاه کشمیر بود دادهٔ نزد ابوسعید خان که تبت مانده بود رفت خان او را مامور لاسه نمود خود بیارکند کوچ کردهٔ در راه کمر تفرقه کلي بمیرزا رو دادهٔ به بدخشان رفت باز بهند نزد همایون بادشاه رسید درحیني که پادشاه منهزم با یران میرفت میرزا با چهار صدوپنجاه سوار ازلاهور برآمدهٔ دربست‌ودوم رجب سنه ۹۷۴ دوبارهٔ کشمیر را گرفته تا دهٔ سال حکمران بود از قضای الهی سنه ۹۸۷ بغلط از دست اجاد الناس شهادت یافت میرزا بلاد توران ومغلوستان و هند دیدهٔ وبخدمت بزرگان رسیدهٔ باهر اکثر هنر وسخنور و جوان دلیر و صاحب تدبیر بود تاریخ رشیدي تالیف اوست بموجب فرمایش ولیم مورکرافت صاحب بهادر میرآخور باشي دولت انگلشیه باهتمام سید عزت‌الله خان صورت احوال‌ها سنه ۱۲۳۸ از روي طوامیر بتحریر تاریخ سنه ۱۲۳۸ یازدهم جمادي‌الثاني سنه ۱۲۳۸ یونت‌ئیل دیباجه اثبات شدهٔ

Translation.

Mírzá Haidar Gúrgán, the son of Mírzá Mohamed Husain Gúrgán and grandson of Yúna Khan (who was born in the house of Baber the king), and brother-in-law to Abú Sa'íd Khan, king of Yárkand and Moghulistán, the son of Sultán Ahmad Khan, the son of the above-mentioned Yúnas Khan, of the progeny of Toghlúq Taimúr Khan, of the race of Chaghatai, the son of Changíz Khan. The Mirza was born in the time of Mahmúd, in the year 905, in the city of Orátapa. After various vicissitudes he, at the command of Abú Sa'íd Khan, made an incursion from Yárkand. After subduing Tibet he conquered Kashmir with 4000 horse, in the same year, on the 4th Sha'bán 935. He then gave it back to Mohamed Shah, who was the king of Kashmir, and went to Abú Sa'íd Khan, who had remained in Tibet. The Khan ordered him to Lása. He himself having set out for Yárkand, died on the road. As there appeared to be general dis-

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cord, the Mirza went to Badakhshán, and then to Hindustan. He came to the Emperor Humáyún as the latter having been defeated was proceeding to Iran. The Mirza went on another expedition with 450 horse from Lahor, took Kashmir again on the 22nd Rajab 974 and ruled Kashmir for ten years. He was accidentally killed by some man in the year 987. The Mirza had seen the cities of Túrán, Moghulistan, and India, and been engaged in the service of the great. He was skilled in most sciences, eloquent, brave, and wise in counsel. The Táríkhi Rashídí was composed by him. By the order of Mr. William Moorcroft, Vety. Surgeon under the British Government, Sayid Izzat Ullah Khan compiled from records an account of the events to the year 1238. The preface was written on the 11th Jamádussání 1238 Yúnt I'l.

Note 1. The expression "Yúnt I'l" denotes the seventh year of the cycle of twelve, current in the chronology of the Arabians, the Persians, and the Turks (or Moghuls), though each nation has its own denominations for the different years. The Ayíni Akbarí gives a full account of these cycles, which were employed for the adjustment of intercalary periods necessitated by the disagreement between lunar and solar years. The Turki cycle was also called I'ghúrí (Oighur is the Russian spelling of the word). The names of the different years are the names of certain animals. They are as follows:

1. Síjqán—a mouse.
2. U'd—a cow.
3. Páras—a panther.
4. Tawishqán—a hare.
5. Lúí—a crocodile.
6. Yílán—a snake.
7. Yúnt—a horse.
8. Qú—a sheep.
9. Bích—a monkey.
10. Takháqú—a fowl.
11. I't—a dog.
12. Tankúz—a hog.

To each of these names the word *I'l* was added, which denotes "year." In Kashmir and Afghanistan, though this calendar is now obsolete, the memorial verses containing these twelve names, are still remembered. The present year is Tankúz. The verses are as follows:

میچقان و اود پارس توشقان و لوی ئیل است
ایلان و یونت وقوی بود نام های سال
پچ ئیل پس تخاقوی ایت ئیل بعد ازان
تنکوز را حساب کن ای صاحب کمال

Note 2. The dates of this inscription also do not agree with those given by the native historians. The inscription places Haidar's first invasion in the year 935. Bírbar gives as the date 939, though he agrees with the inscription in the number of horse, 4000; Captain Newall gives the less probable amount of 14,000 cavalry. Hügel (following principally Abul Fazl) gives 930 (A. D. 1523) as the year of the invasion, and 10,000 as the size of the army. It is possible to reconcile these statements by assuming that the army of invasion consisted of 10,000 foot and 4,000 horse. The second invasion the inscription places in 974; Captain Newall (who does not seem to recognise the invader as the Mirza Haidar of the former invasion from the north) gives its date as 947, which is in general agreement with the above-mentioned Pandit, and with Hügel, both of whom give 948 (1541); the latter, however, speaks of "a considerable force." The statement of the inscription must probably be understood to mean that he set out from Lahor with 450 horse; he probably gathered an army of adventurers and malcontents as he proceeded. The confusion is very great in that part of the histories of Kashmir, which relates to the decade of Haidar's *rule*,—it does not seem to have been *reign*—principally because he who was at one time Haidar's nominal sovereign, was soon afterwards his nominal opponent. The name of this individual, evidently a puppet, so common in all Asiatic histories, was doubtless مارك but whether this should be read *Tárik* Sháh, as Bírbar reads, or *Názik* Sháh, as Hügel reads, appears uncertain; Captain Newall gives the name *Tarkh* Shah, which is undoubtedly wrong. In this period also falls the first recorded attempt on the part of the Moghul emperors to take possession of the valley. For Haidar, much harassed by the rising Chak family, offered the sovereignty of the country to Humáyún, when it was really no longer in his power to offer it. The Mirza's embassy found Humáyún encamped at Atok, on his return from Persia to Hindustan. Humáyún set out immediately for Kashmir; but the expedition failed, as the army mutinied at or near Mozufferabad. Haidar's death the inscription places in 987, Bírbar in 959. The latter relates that during his war with Tárik Shah, Haidar went alone into the fort of Avantipúr; a butcher asked him who he was; he could not reply in Kashmiri, whereupon the butcher killed him with the axe which he happened to have in his hand. Newall says that his death took place (in 1551

A. D.) as he had issued from the fort of Indrakoul to reconnoitre the enemy's position.

Note 3. A question remains whether Moorcroft had this inscription cut, as appears most probable, and if so, why. The reply has been suggested that he did it in order to put on record the feasibility of an invasion of Kashmir by *cavalry* from the north as well as from the south. It is not unworthy of remark that many a tourist, misled by the name of William Moorcroft upon the tombstone, has stated, in print and out of it, that Srinagar contains the grave of the enterprizing traveller.

III. Inscriptions on and near the Great Mosque.

Opposite the principal entrance of the Jami Masjid, a building most remarkable for its numerous tall cedar pillars, there is a *bauli* with the following inscription:

بر آمد چشمهٔ فیض الهي بحسن سعي مشتي خاکساران
بتوفیق خدا این کار محمود گرفت انجام و مشکل گشت آسان
خلوص نیت و صدق ارادت شده صرف بنایش از دل و جان
پی دنیا و دین این آب‌رو بس که شوید روی خود زو هر مسلمان
ازین چشمه باني چشم دارد که یابد شست و شو طومار عصیان
گناه خلق گردد شسته زین آب که باشد مبنعش دریای عرفان
بود وجه کرایه از دکاکین پي ترمیم حوض فیض جریان
خدا یا بانیش را از تفضل بدست خود بده تشریف ایمان
که دارد ورد خود این بیت اوستاد ز روی التجا با چشم گریان
چو نامم در ازل محمود کردي الهي عاقبت محمود گردان
بدریای تفکر رفته ا گه پي تاریخ این فرخنده بنیان
خضر گفتا که جاري فیض ماباد همین تاریخ بنویس ای سخن دان

الهم اغفر لبانیه ولوالده یا غفار سنه ۱۰۵۲

Translation.

The fountain of God's favour came forth through the laudable efforts of a handful of humble men.

By the grace of God Mahmúd began this work, and the difficult became easy.

The fund for its construction was purity of intention and sincerity of aim, with earnest hearts.

Of worldly and religious glory this is enough that every Musulman may wash his face in *it*.

From this fountain he (the builder) looks for that in which the record of transgression finds cleansing.

People's sin is washed away by this water whose source is the sea of knowledge.

Let the amount of the rent of the shops be for the repairs of the tank flowing with blessing.

Oh God, with thine own hand give graciously to its builder the ennobling faith.

For this, the teacher's verse, has its own task; he takes refuge with weeping eye (and says):

As thou at the beginning hast given me the name of Mahmúd, oh God, make it Mahmúd in the goal!

Into the sea of thought the Intelligent Man (*i. e.* the composer of the inscription) went for the date of this auspicious building.

Khizt said, Let my favour flow on; write this date, oh poet:

Oh God, pardon its builder and his father,—Oh Pardoner!—1056.

At the entrance of the Great Mosque itself, there is the following decree of the Emperor Sháh Jehán:

شاه جهان بادشاه غازي

نقل فرمان سعادت نشان حضرت سليمان مكاني صاحب قران ثاني
كه بتاريخ هفتم اسفندارمذ ماه الهي حسب الالتماس كمترين خانزادان
احسن الله المخاطب بظفر خان درباب برطرف نمودن بدعت‌هائيكه در زمان
صوبه‌داران سابق دربلدهٔ دلپذير كشمير شده بود و باعث خرابي رعايا و سكنه
اين ديار بود شرف ورود يافته •

فرمان

چون همگي همت والانهمت مصروف ومعطوف بر رفاهيت خلق است بنابرين
بعضي امور كه در خطه دلپذير كشمير باعث آزار سكنه انديار مي شد حكم
فرموديم كه برطرف باشند ازجمله آنمقدمات يكي آنست كه وقت چيدن
زعفران مردم را بعنف ميبردند كه زعفران بچينند وقليلي نمك بعلت اجورهٔ
آن بانمردم ميدادند وازين جهته بالجماعه آزار بسيار ميرسد حكم فرموديم
كه تكليف چيدن زعفران اصلا بكسي نكنند وانچه تعلق بخالصه شريفه داشته
باشد مزدوران را راضي ساخته اجورهٔ واقعي بدهند وانچه تعلق بجاگيردار

داشته باشد کل زعفران بجنس حواله جاگیر دار نمایند تابهر طریقی که خواهند
چینند مقدمهٔ دیگر آنست که در زمان بعضی از صاحب صوبه‌هاي کشمیر
برسر خروار شالي دو دام بعلت هیزم میگرفته اند درعمل اعتقادخان چهاردام
بان علت برسر خرواري گرفته‌میشد چون ازینجهت ازار بسیار نیز برعایا میرسید
لذابرین حکم فرمودیم که بالکل رعایارا از طلب این وجه معاف دارند و بعلت
هیزم هیچ چیز نگیرند مقدمه دیگر آنست که دهی که جمع آن زیادهٔ از چهار
صد خروارشالي بوده‌باشد ازان دیهه دو گوسفند حکام انجا هرساله میگرفته‌اند
واعتقادخان درایام صاحب صوبگي خود بجای گوسفند برسر هرگوسفند شصت
وشش دام میگرفته چون ازین جهت نیز برعایا آزار تمام میرسید بالکلیه حکم
فرمودیم که‌برطرف باشد نه‌گوسفند بگیرند ونه‌نقد باینعلت رعایا را ازگرفتن آن
معاف دارند دیگر اعتقاد خان درایام صاحب صوبگي خود سرا سري نموده
برسر هرملاحی خواه جوان وخواه پیرخواه خورد سال هفتاد وپنج‌دام‌میگرفت
ومعمول قدیم ان بوده که برسر جواني شصت دام برسر پیري دوازده دام
برسرخوردسالي سی وشش دام میگرفته‌اند حکم فرمودیم که دستور سابق را
معمول داشته بدعتیکه اعتقاد خان کرده برطرف دانند بمقتضای آن عمل
نکنند مقدمه دیگر آنست که‌صاحب صوبه‌ها در وقت میوه درهرباغ ودرهرباغچه
که میوهٔ خوبي که گمان داشته اند کسان خودرا تعین مي نموده اند که آن
میوه را بجهت آنها محافظت نمایند ونمیگذاشته اند که صاحبان آن باغ ها
وباغچه‌ها آنمیوه را متصرف شوند ازین جهة آزار بسیاری بانجماعه میرسد
چنانچه ازآن مردم درختهاے میوه را دور ساخته اند حکم فرمودیم که هیچ
صاحب صوبه قرق میوهٔ باغ وباغچه کسی‌نکند مي‌باید که حکام کرام ودیوانیان
کفایت فرجام وعمال حال‌واستقبال صوبه‌کشمیر این‌احکام جهان مطاع‌را مستمر
وابدي دانند تغیر وتبدیل بقواعد آن راه ندهند هرکسکه که تغیر وتبدیل را
راه دهد بلعنت خدا وبغضب پادشاهي گرفتار خواهد شد تحریر فی‌التاریخ
۲۶ آدر ماه آلهي •

Translation.

GOD IS GREAT.

Shúhi Jahán the King, Defender of the Faith.

Copy of the auspicious order of his Majesty who occupies the place of Solomon, the Lord of the Conjunction, the Second, which was recorded on the 7th of Isfandármuz (February), according to Akbar's calendar, on account of the petition of the least of slaves (may God be gracious to him who is known by the name of Zafar Khan), with reference to the removal of the oppressions which were practised in the time of former Súbadárs in the beautiful city of Kashmir, and

were the cause of the ruin of the subjects and inhabitants of these regions.

Firmán.

Since all our exalted desire is turned and bent on the contentedness of the people, hence we gave the order for the repeal of some acts which in the beautiful country of Kashmir became a cause of distress to the inhabitants of the land. Of the number of those matters one is this that, at the time of collecting the saffron, men used to be impressed for this work without any wages except a little salt, and hence the people are suffering much distress. We ordered that no man should by any means be molested as to gathering the saffron; and as to saffron grown on crown-lands, the labourers must be satisfied and receive proper wages; and whatever grows on lands granted in jágír, let the whole saffron in kind be delivered to the jágírdár that he may gather it as he pleases. Another grievance is this that in the time of some of the Súbadárs of Kashmir they used to levy two *dám* for wood on each Kharwár (about 180 pounds) of rice, and during the government of I'tiqád Khan four *dám* for the same purpose were levied on each Kharwár. Since on this account also the people were much distressed, hence we ruled that the people should be entirely relieved of this tax, and nothing should be taken on account of wood. Another grievance is this, that a village whose rental was more than 400 Kharwár of rice, was obliged to furnish to the rulers of the place two sheep annually. I'tiqád Khan, during his rule, took 66 *dám* in the place of each sheep. Since on this account also the people were much annoyed, we gave a strict order that it should cease; neither should the sheep be taken nor money in their place; the people shall be held excused from paying this impost. Moreover, I'tiqád Khan, during his incumbency, levied a summary poll-tax of 75 *dám* on each boatman, whether a young, or an old man, or a boy, whilst it was the established custom formerly to levy 60 *dám* on a young man, 12 on an old man, and 36 on a boy. We ordered that the former custom should be re-established, that the oppression of I'tiqád Khan be stopped, and that people should not act in accordance with it. Another grievance is this that the Subadárs, in the fruit season, placed their own men in each garden, large and small, which appeared to contain good fruit, to watch the fruit for themselves and did not allow the owners of those gardens to use the fruit; hence much annoyance

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was caused to these people, so that some of these men have destroyed the fruit trees. We ordered that no Subadár should lay an embargo on the fruit of the orchard or garden of any one. It is proper that noble governors and useful collectors and the tax-gatherers of this and future times in the province of Kashmir should consider these orders as lasting and eternal, nor should they admit any change or alteration in these regulations. Whoever admits any change or alteration, will fall under the curse of God, and the anger of the king. Written on the 26th Ádar (March) according to Akbar's calendar.

On the Vegetation of the Jhelum District of the Punjab.—*By* J. E. Tierney Aitchison, *M. D., F. R. C. S., F. L. S., Assistant Surgeon Bengal Army, &c., &c., &c.*

To systematise a description of the vegetation, it will be as well to divide the district into several portions, giving a leading and particularised description of what may be considered the principal divisions, and then, comparing the other divisions with those already described, pointing out any characteristic features that may belong exclusively to that under our immediate notice.

For the ready comprehension of the several divisions or tracts, the accompanying diagrammatic map is attached, shewing the district to be divided into

The Jhelum Tract,
The Jelallpore Tract,
The Salt Plains,
Plains upon the Salt Range,
The Tract of the low ranges of Hills,
The Tract of Ravines,
Hills of the Salt Range,
Tract of Mount Tilla.

The Jhelum Tract.

The town of Jhelum, consisting of about 500 houses, is the head quarters of the Civil Station, and hence is looked upon as the chief town, although it is in truth but the fourth or fifth as regards number of inhabitants, trade, &c., in comparison with the other towns of this

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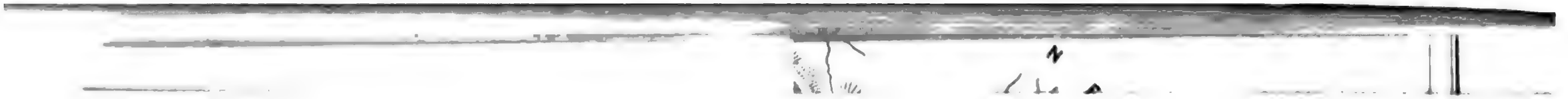

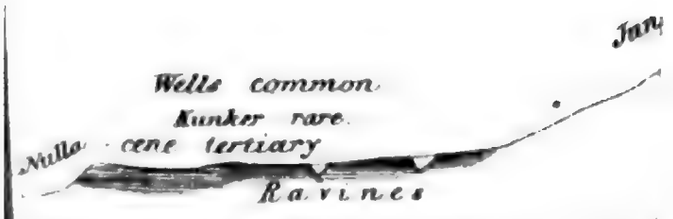

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DIAGRAMATIC

OF THE

JHELUM D

From Jhelum

to the Bukra

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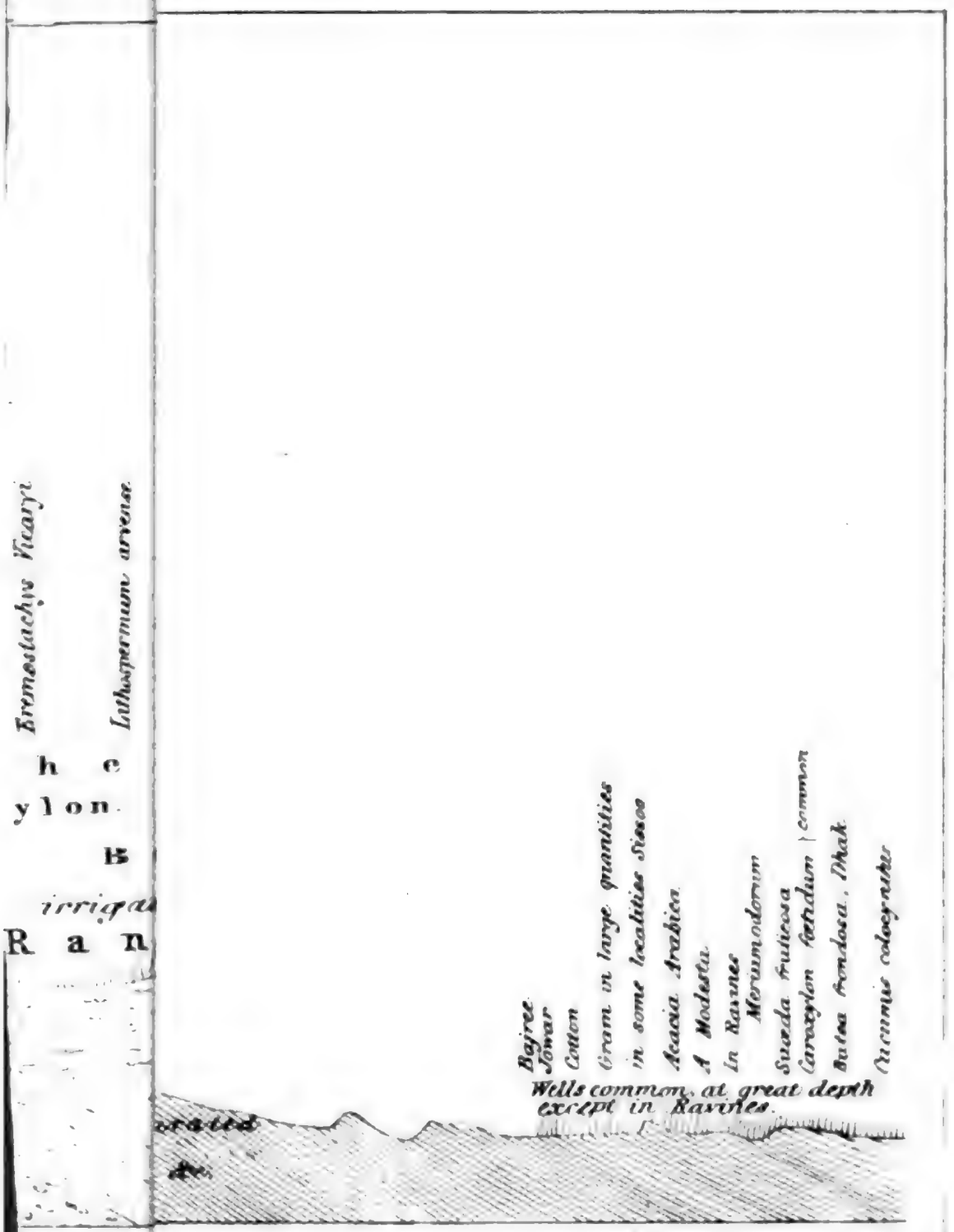

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el.

MATIC SECTION

OF

LUM DISTRICT

due north through Bhagunwalla

ge to the Ravine Country.

copied from Fleming)

W & A K Johnston Lithographers Edinburgh

district. It is situated in Lat. 32° 56′ N. Long. 73° 47′ E. (A. K. Johnston, 1855) and is about 671 feet above the sea level. It may be considered as occupying the centre of the Jhelum Tract. Nearly a mile to the west of this is situated the Military cantonment, once occupied by a large force of native troops, but since the mutiny, all but left to ruin.

The Jhelum Tract is the plain country enclosed within the Kharian and Ratian ranges of hills, with the Jhelum river running in the midst. It commences at the fort of Mungla, and ends some miles above Jelallpore, where the Kharian range and Surafur hills close in upon the river. It consists on the whole of a beautiful plain, which, near the bases of these hills, is cut up into ravines, but afterwards opens out into richly cultivated flat land. This, on the Jhelum side, is divided into three parts, by the wide sandy beds of the Kuhan (or Bukrala) and Boonah nullas.

The geological formation of this tract consists of—

1st. Recent tertiary, close to the river, which, in some places, as at Doolial and Cyngoee, is made up of a rich mould yielding profuse and good successive crops.

2nd. Pleistocene tertiary; this lies below the recent tertiary, but the latter disappears as we go inland, and the Pleistocene crops out upon the surface, containing beds of kunkur at the river, of some value, with a tolerable amount of surface soil.

3rd. As we approach the base of these ranges of hills, viz., the Ratian, &c., we enter upon a Miocene tertiary country, characterised by deep water-courses or ravines full of huge boulders, shingle and sand. From this the hills suddenly rise up, consisting of clay, marl, conglomerates, and sandstone, the last containing fossils similar to those found in the Sewalik range of hills, of which the geology of these hills is supposed to be the counterpart.

Water is obtained in this tract at little cost and labour, from wells about 20 feet deep, which yield a plentiful supply, fresh and sweet. A well is to be met with, attached to every village, and to many there are several, all worked with the Persian wheel. Their water is not used for irrigation, excepting for tobacco and small patches of cotton, but chiefly for gardens: the former of these crops indeed may be regarded as garden produce. Water is not raised from the river for irrigation. One stream of fresh water, the

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Kuhan nulla, runs through this tract. Its water is not used for irrigation, but where this stream passes through the range of hills at Rhotas, its power is used to drive three or four flour mills. The remains of a canal of the old Seikh time are to be traced from near Doolial, in a direct line, to a little above the Civil Lines at Jhelum, across that portion of the country, where the river takes a rapid turn from a southerly to a westerly course.

AGRICULTURAL PRODUCE.

Two crops are generally produced during the year, viz., the Rubbee and Khureef. For the Rubbee crop the Zemindars begin to sow about the end of October; and collect the harvest during April. The Khureef crop is sown in June, and is collected about the end of September or during October. The hot weather extends from the middle of April to the middle of October; the cold weather over the rest of the year. The chief falls of rain occur about the end of August or during September. Heavy rains also fall in March and April. The crops generally throughout the Jhelum district are dependant for their maturity upon these special falls of rain.

The chief products of the Rubbee crop are, Wheat "Gehun," *Triticum æstivum*, var.; Barley, "Jhow," *Hordeum hexastichon*. Gram, "Chunna," *Cicer arietinum;* Rape, "Surson," *Brassica campestris* and *Eruca* L.; Linseed, "Ulsee," *Linum usitatissimum;* Safflower, "Kusoomba," *Carthamus tinctoria;* with a great variety of the Melon tribe.

Those of the Khureef crop are—

Millet, var. "Bajree," *Penicillaria spicata*. Millet, var. "Jowar," *Andropogon Sorghum;* Cotton, "Kupas," *Gossypium herbaceum*. Indian corn, "Makee," *Zea Máys*. Sugarcane, "Gunnah," *Saccharum officinarum;* Oil seed, "Til," *Sesamum Indicum;* Indian hemp, "Sunn," *Crotalarea juncea*.

Where irrigation may be resorted to throughout the year, tobacco and rape are raised during the whole hot season, as in the Goojerat district.

Wheat. Of this the bearded white variety is that which is chiefly grown, although the red is not uncommon; both are of average quality. A large exportation of this takes place; chiefly towards Mooltan.

Barley. The six rowed variety is produced of a very superior quality and is largely cultivated; the greatest part of this crop being also exported towards Mooltan.

Gram. This is cultivated, but in small patches in this tract—of a fine quality. The quantity, however, is not sufficient for local consumption, a large importation taking place from other parts of the district. Along with it we have the "Massoor," *Eruum lens*, cultivated, either mixed with the former or separately.

A very small quantity of the pulses are cultivated in this tract, viz.

"Moth." *Phaseolus aconitifolia.*

"Mung." *Phaseolus mungo* (The split peas of which constitute the varieties of Dahl). Their quality is good, though the crop is scarcely sufficient for local consumption.

Bajree and Jowar, both excellent in their quality, are very largely cultivated, and together with barley and wheat may be considered the staple crops of the whole district. The Zemindar-class live chiefly on the Bajree and Jowar, consuming for their food little of either wheat or barley. Their cattle also are largely dependant for fodder upon the Boossa obtained from the crushed stalks and leaves of the two former, owing to the great want of pasturage in this tract. There are several kinds of Boossa for feeding cattle, viz., that most commonly in use, which is produced, as already stated, from the crushed leaves and stalks of the Bajree and Jowar; that made from the straw of wheat and barley; that made from the straw and leaves of the pulses and gram, which last is the highest in price and by the natives given chiefly to their horses, as also to cattle for fattening. Lastly, Boossa obtained from the leaves of the "Baer" the *Zizyphus vulgaris.*

Oil seeds. Of these we have—

"Surson." The seeds of *Brassica campestris*, and *Eruca*, L. which by simple expression yield oil called commonly "Surson ka tel," or "Thara meera ka tel." *B. Eruca* yields a darker oil than *B. campestris* and hence, to distinguish this oil from that of the latter, it is often called "kala surson ka tel" or "kala surson." The seed of the Til, *Sesamum Indicum*—also by simple expression, yields "Til ka tel" viz. Til oil.

The seed of the flax "Ulsee" yields "Ulsee ka tel" viz. Linseed oil. The plants of the above are cultivated, but not in sufficiency for the uses of the tract, and hence their products are largely imported.

Cotton is grown in tolerable quantities, but as a field crop, is very poor in quality. Where, however, it is grown as a garden crop and freely watered, some of the produce is exceedingly good, both as

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regards quantity and the quality of the fibre. The fact is, that the soil in general is too poor and too dry, but if this be properly enriched with manure, freely watered, and under shade, a good crop is the usual result.

Tobacco. "Tumbakoo," *Nicotiana Tabacum*, is cultivated more as garden produce and undergoes free irrigation. There is not so much raised as is required for local use, but what is raised, is considered of a good quality.

Safflower. Of this a large quantity is cultivated, good in quality, and sufficient both for the local market and for exportation. The seeds are used, though not extensively, for making oil.

Indigo. *Indigofera tinctoria*—"Nil," is cultivated strictly for home consumption, and is used for dyeing the beard of the cultivator.

Rice. "Chaul," *Oryza sativa* has been cultivated in this tract, but very rarely. The fact is, there is no soil sufficiently moist and loamy for its cultivation.

Sugar-cane grows in this tract only as a garden product, not to have its juice extracted for the preparation of sugar, but to be sold in the bazar in the cane, and thus eaten by the natives. The cane is very poor, being small and exceedingly silicious.

"Sunn," *Crotalarea juncea* and "Sooja Para," *Hibiscus cannabinus* —are both grown in small patches and in stripes round fields, the first, however, more commonly. The fibres of both are good, and are manufactured into a coarse twine by the zemindar and thus sent to market. They do not seem to be cultivated for exportation.

Garden produce.

From gardens, which are attached to nearly every village, we have the markets well supplied with all the vegetables that are usually cultivated by natives, and which are used extensively by them in the form of "thurkarees." The principal vegetables are "Moolies," varieties of the radish—"Piaz," onions—"Baingons," egg-plant, *Solanum Melongena*; "Shalgum," varieties of the turnip—"Poluch," varieties of the spinach—"Gaager," varieties of carrot—"Shuker-kund," species of Arum—"Moukha," *Portulaca oleracea*—"Ram-turai," *Hibiscus longifolius*—besides an immense variety of the *Cucurbitaceæ* viz. "Kudoo," *Cucurbita Pepo*; "Keera," *Cucumis sativus*; "Khurbooza," *Cucumis Melo*; "Turbooza," *Cucurbita Citrullus*; "Kukree." *Cucumis utilissimus*, &c.

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And used as condiments we have—

"Lal-mirch," *Capsicum frutescens;* "Ajwain," *Ptychotis Ajowain;* "Sonf;" *Fœniculum Panmorium;* "Aneeson," *Pimpinella anisum;* *Cichorium intybus;* "Lusson," *Allium sativum.*

The following may be considered as a rough sketch of the vegetation round a village of the district. Close to the village there are generally one or two small plots of garden ground, in the vicinity of the wells from which they are watered. These gardens are carefully surrounded by a strong and tolerably high fence of the branches of the "Keekur," *Acacia Arabica.* Round the margin of these plots principally, and in close proximity to the wells, will be found trees of the "Keekur" *Acacia Arabica;* "Baer," *Zizyphus jujuba;* a few "Lessoora," *Cordia Myxa;* an occasional "Burna," *Crataeva religiosa;* sometimes a "Sissoo" *Dalbergia Sissoo;* and not unfrequently some fine specimens of the *Ficus Indica*, "Bore" and *F. religiosa*, "Pipul." Then come plots of ground a little larger, enclosing tobacco, cotton and sugarcane, the last uncommon in this tract. These several plots are more or less watered from the wells, but with these exceptions no further irrigation of the crops in general is carried on.

The rest of the fields open out beyond with no divisions between them, except perhaps a footpath; wherever a hedge of any sort is met with, one may be certain of the close proximity of the dwellings of the natives or of places for housing cattle.

A few fruits, the produce of the district, are sold in the market. The chief of these are the mangoe, in a green and unripe state and of poor quality; the orange, sweet lime, and citron, all excellent; also, during nearly the whole year, the plantain. In the gardens of Europeans, however, we have a large number of English vegetables cultivated, with such fruits as the grape, fig, guava, apricot, peach and strawberry, all good of their kind.

Trees.

Most of the trees in the Jhelum tract have been introduced, though many have become naturalised; few indeed can be said to be native to it. We will therefore in writing of them, class them under two heads.

1st. Trees which have been introduced.

2nd. Trees which are native to the district.

1st.—Of trees that have been introduced we have—

Cordia Myxa, "Budda-lessoora." The large-fruited Lessoora. This yields the large kind of Sebesten. It is a handsome showy evergreen tree, with good-sized timber, but is only found in gardens.

Cordia latifolia, "Lessoora." This tree yields the small Sebesten, which is scarcely used. It is found in most of the gardens in the district. It has small timber, which is not put to any use in particular.

Syzigium Jambolanum, "Goulab Jaman." Of this there are a few fine trees, generally near the dwellings of Fakirs. There is one tree on the summit of Mt. Tilla, fifteen feet in circumference.

Parkinsonia aculeata, "Velaiti Kekur."

Sesbania Ægyptiaca, Pers.

These two latter exist as tree-shrubs: both are true garden plants and are extending their range; both being now occasionally met with near villages.

Bauhinia variegata, "Kochnar." A garden tree, the flower buds of which are used largely in curries and pickles.

Morus alba and *Morus laevigata*, Wall. "Toot," are in this tract dwarfed from want of soil and moisture, and do not yield timber.

Melia Azedarach, L. "Buchyan," Persian Lilac is attached to all villages. The timber is of no use: the foliage gives a good shade and the ripe fruit is greedily seized upon by goats and sheep.

Moringa pterygosperma, "Sohounja," or horse-radish tree, in this tract is a garden product; its fruit is not used for oil making, nor is its timber applied to any purpose. It affords, however, a good shade.

Populus Euphratica and *P. dilatata*, Don. "Safaida" are both the products of the gardens of Europeans.

Acacia Serissa, Roxb. "Seriss," grows to a very handsome tree, generally near European dwellings.

Cedrela Toona, "Toon," has been introduced but lately. It both flowers and fruits.

Bombax heptaphyllum, L., "Sembul."

Cassia fistula, L. "Amultas," the Indian Laburnum grows near dwellings, not common; produces good fruit and flowers generally twice during the year.

Salix Babylonica, frequently met with near bunees, tanks, and damp localities.

Ficus religiosa, "Pipul," and *F. Indica*, "Bore, Burgot," Banyan tree. Fine specimens of these are found throughout the district. It is a matter of opinion as to whether their origin here be due to natural causes or to their having been introduced. If the former, they must be upon the confines of their northern limits.

2nd.—Trees native to the district.

Crataeva religiosa, "Burna." This seems to have been at one time a common tree in this tract, more especially upon the alluvial soil near the river, where there are still a number of very large trees which give a splendid shade and form large timber. The fruit is used to mix with mortar for making a strong cement.

Tamarix Indica, Gallica, L. "Furas." In this tract the only trees we have of this, have been planted, but in some other tracts we find it is prolific. It produces a miserably poor brittle wood, used chiefly for the fire. This tree resembles a fir and indeed by most people it is generally mistaken for such.

Acacia Arabica, "Kekur, Babool." Of this we have two varieties, viz.: *A. A.* var. *spina*, *albida*, and *A. A. var.* cypress. This latter is the most elegant but the least common in this tract. They are both large handsome trees yielding good shade, give excellent, useful timber, and grow rapidly and well, over the whole district. Their wood is used largely for ploughs, well wheels and tent pegs; their branches for feeding sheep, goats, camels and cattle in general, as also for making hedges. The bark is used for tanning and making country spirits, besides yielding not unfrequently a large supply of gum, "Gondh."

Acacia modesta, Wall "Phulai." In good alluvial soil and where there is drainage this becomes a fine timber tree. Otherwise, as where it grows on the hills and ravines of the district, it is but a poor twisted, stunted shrub, fit only for firewood, but for this purpose it is excellent; camels, goats, &c. feed in Spring on its young leaves and flowers. Its timber is very hard and used greatly for wheels, especially when these are to be exposed to wetting. The heart wood becomes quite black and is as hard as iron.

Dalbergia Sissoo, "Sheshum." Of this, which produces the most valuable timber, we have but little, and what trees there are, have apparently been planted during the rule of the English Government in

the Punjaub. A few trees, however, of Seikh times still exist near wells, and shew splendid timber. The natives of the district would induce one to believe that this had formerly been a common tree and that during the Punjaub campaign it had been cut down. I believe it has been introduced since our conquest of the country, with the exception of the specimens near Tullagung.

Zizyphus jujuba, "Baer," is a good, rapid growing tree, produces excellent wood, highly valued by the zemindars, and requires no care or trouble to rear; its fruit and leaves yield good fodder to goats, sheep, &c. and its branches make excellent hedges.

The "Baer" and the "Kekur" are the staple woods of the whole district, from which all the woodwork required by the agricultural population is made. They spring up naturally from their seeds, whether distributed by winds, men or animals. They require no care in their youth, and both grow freely without water, (or at least under very straitened circumstances for it,) so long as they have some soil to grow in. On stony, sandy land they do not grow, but on clay they spring up readily. At present there are few or no old trees in the Jhelum tract and decidedly not many in any of the other tracts; that is to say, trees fit for timber. This is due solely to carelessness and negligence on the part of the zemindars to substitute young trees for those cut down; hence there is at present a scarcity of timber, which in a few years, if the present state of things goes on, will end in a nullity of local produce. It appears to me that Government should take up this subject in earnest, and only permit trees of above a certain age to be cut down, making it an established rule, that for every tree cut down, a proportionate number of young trees be planted. The greater the age of the tree cut down, the larger should be the number of young trees required to be substituted for that one removed: and thus, instead of a scarcity of timber, in a few years, a cheap supply of wood grown on the locality would be the result, besides the benefit that would otherwise accrue to a country at present all but destitute of trees. In replacing trees cut down, it is strongly to be recommended that the Baer and Kekur be preferred to any others: not even excepting the Sissoo, which, although a valuable timber tree, takes too long a time to become useful and is too tender, requiring too much nursing in its youth, to be of real paying benefit. The rapid growth of the Baer and Kekur and their non-liability to injury

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from want of care, besides their great durability, more especially during exposure to heat and moisture, are characters which render them of immense value to the zemindar, who uses their wood for ploughs and well-wheels where it is continuously exposed to the extremes of moisture and dry heat; besides which, he gets a quick return for the labour and trouble expended in rearing the trees, which are grown on the spot where their wood is required for consumption. Thus he is put to no expense for carriage, while the branches of both trees are of great value to him for fences for his fields, and the leaves, blossom and fruit as fodder for his cattle.

Characteristic Plants.

The characteristic plants of the Jhelum tract may be classed as those met with—

1st. On the Islands and banks of the river,

2nd. On the moist marshy soil left by the receding of the river,

3rd. In wells,

4th. As weeds in gardens,

5th. As weeds in fields.

6th. The remainder are met with on roads, waysides, fields aud gardens, in short are not confined to any particular locality.

1st. The characteristic plants met with on the islands and banks of the river Jhelum are :—

Tamarix dioica, Roxb. Called in the vernacular generally "Pilchee," "Jhao," and frequently "Furas" (the latter name, however, is more generally applied to the tree *T. Indica*). This with *Saccharum spontaneum* covers the islands (balaa's) during the hot weather, with a dense low jungle. Both are considered of some value for thatching; the former is also used largely for all kinds of rough basket work. From the great abundance of both, and their cheapness, they are used to consolidate the soil laid upon the Grand Trunk Road. By the end of October, the islands are cleared completely of this jungle, and nothing but the roots and stumps of the plants are left, which begin again to send up fresh shoots in March and April. The fresh shoots of the latter are at this time fed on by cattle. Cattle will not, however, feed on the full grown grass, which is too coarse and rough for them. On some of the Balaa's, but chiefly on the banks of the river on the Goojerat side, the *Saccharum Munja* "Moonj," is to be met with in large quantities, forming a much higher and thicker

jungle than that of the *S. spontaneum*. Its value is much greater, being used for rope-making. The cause of its high price is, that ropes made from it are able to withstand the effects of moisture combined with strain, much longer than any other rope made from materials as readily obtained. It is largely used by boatmen on the river, as well as for the anchorage of the boats that form the bridges on most of the Punjaub rivers. In 1861, the Moonj harvest was a failure, and in its place large quantities of the leaves of the *Chamærops Ritchiana*, "Puttha" from the Attock district, were imported to the rest of the Punjaub to supply the bridges with moorage rope. The ropes are made by steeping the leaves in water for a certain number of days, then tearing them into ribbon-like strips, which are plaited together upon the principle of the watchguard plait, and then two or three of the plaits are twisted into one rope of the required thickness. The Moonj is said to bear a heavier strain and last longer than the other, when both are exposed to moisture.

The *Anatherum muricatum* "Khus Khus," is met with in some quantity, chiefly on the river's bank, both cultivated and in a wild state, near Russool; also a few miles above Jelallpore. It is of value to the zemindars who sell it for being made into tatties, &c.

2nd. The characteristic plants met with in moist marshy ground left by the receding of the river, &c., are:—

Machlys hemisphærica, D. C.

Mazus rugosus, Lour.

Mimulus gracilis, R. Br.

Veronica anagallis, L.

Polygonum Persicaria, L.

Rumex acutus, Roxb.

Potentilla supina.

Zeuxine sulcata. The only orchid obtained in the whole district and this only on the banks of the remains of an old canal below the Government garden at Jhelum.

Alisma Plantago, L. This flowers early in April, and its presence in this part of the Jhelum district, seems to be due to the river bringing down the seeds from a higher elevation; these vegetate in the pools of water left by the receding of the river. The seeds of the Singhara, *Trapa bispinosa* are also brought down by the river floods in large quantities, but I have never seen them vegetate.

Potamogeton crispus, L.
Juncus bufonius, L.
Eleocharis palustris.
Isolepes barbata, R. Br.
Scirpus maritimus.
Cyperus rotundus, L.
Cyperus niveus.
Cyperus haspan.
Ranunculus sceleratus, L.

3rd. In the wells of the district we meet with—
Adiantum capillus-Veneris.

4th. As weeds of gardens. Garden weeds are in much greater variety than one would at first be apt to suppose. This is simply due to the presence of a moister and richer soil than that of the surrounding country.

Fumaria parviflora.
Malcolmia Africania, R. Br.
Sisymbrium Sophia, L.
Sisymbrium Irio, L.
Capsella bursa-pastoris, R. Br.
Lepidium sativum, L.?
Goldbachia lævigata, D. C.
Oligomeris glaucescens, Camb.
Viola tricolor, Cult.?
Silene conica.
Silene rubella, L.
Arenaria serpyllifolia, L.
Portulaca oleracea.
Medicago denticulata.
Trigonella incisa.
Indigofera Senegalensis, D. C.
Vicia sativa, L. and other species.
Centaurea cyanus, L.
Anchusa hispida, Forsk.
Nonnea Pulla, D. C.
Antirrhinum orontium, L.
Veronica agrestis, L.

5th. The characteristic plants met with as weeds in fields.

Early in March *Oxalis corniculata*, *Anagallis arvensis*, *Lathyrus aphaca*, L., and *Asphodelus fistulosus* are seen springing up in immense quantities over the whole of the fields, along with the spring crops. The former are not very injurious, and hence are not weeded out, but the last if allowed to proceed in its growth would undoubtedly choke, at all events, wheat and barley. In some fields that have been sown late and in which none of the corn crop is as yet up, the *Asphodelus* at a very little distance may be easily mistaken for the corn crop. This therefore, when it is large enough to be grasped by the fingers, is carefully weeded out from the cultivated ground.

Sesbania aculeata is very common throughout the fields, and during the months of August and September, it may be seen overtopping the Bajree or other autumnal crops.

Celosia argentea, L. grows amongst the Bajree and Jowar, and is found as a weed from a few inches in height to a shrub of fully seven feet, covered with a profusion of lovely pink flowers. The natives, upon cutting down the crop, curiously enough always seem to leave the plants of this, which remain conspicuous over the reaped fields.

Baliospermum polyandrum. This seems to be one of the most difficult shrubs to eradicate, from the large quantity of seeds that one plant bears, and its readiness to germinate. It is not very noticeable until the autumnal crop is cut. Immediately after this, the plant rapidly produces a dark green foliage with flower and fruit, assuming the characteristics of a shrub. It occupies a belt of land half way between the Jhelum and the Ratian range of hills, from which it does not seem to deviate.

6th. Characteristic plants, met with on roads, &c., &c., &c.

Calotropis procera, R. Br., "Ak Madar." This is to be found in every part of the district, from the sandy wastes to the most cultivated soil, from the plains of the Jhelum to the heights of the salt range and Mt. Tilla. It is a rank weed, but being easily eradicated, does not give the cultivator much trouble, except on the edges of the fields, where carelessness permits of its growth.

Adhatoda vasica, Nees, "Bansa and Bakoor." This also is a disagreeable neighbour to cultivation, but is easily kept at a proper distance. It is to be found at an altitude of from 700 to 3,200 ft. and on the Ratian range of hills forms a belt of vegetation pecu-

liar to the boulders that form a portion of that range. In the ravine country it grows as a large spreading bush.

Peganum Harmala, "Hurmool," forms a thick dense bush about a foot in height and although met with on the low ranges of hills, &c., it is not so flourishing as in the plains, round the edges of fields and on roadsides.

Tephrosia purpurea, Pers. covers the plain country wherever it is allowed to grow, and exists as a rank weed especially where there is no vegetation of higher growth than itself: it is easily choked, but where grass like the Doob and similar creeping plants, with *Pimpinella crinita*, Boiss, and *Trichogyne cauliflora*, D. C. cover the soil, as on the parade ground, the plant quickly spreads itself in great luxuriance.

Tribulus terrestris, is met with, creeping close to the ground in great quantity over the whole district, with *Malva parviflora*, L.

Centaurea calcitrapa, L.
Microrhynchus nudicaulis.
Boerhaavia diffusa, L.
Convolvulus arvensis, L.
Convolvulus pluricaulis, Choisy.
Heliotropium undulatum, Vahl.
Heliotropium Europæum, L.
Solanum Jacquini Willd "Kuthelee Kunth."
Withania somnifera, Dun.
Chenopodium album, L.
Crozophora tinctoria, Juss.
Lathyrus aphaca, L.
Alysicarpus nummularifolius, D. C.
Alhagi maurorum.
Nomismia aurea, W. & A.
Xanthium strumania, L.
Artemisia scoparia, W. & K.
Echinops echinatus, Roxb.
Ipomœa sessiliflora, Roth.
Trichodesma Indica, R. Br.
Solanum nigrum, L.
Giesekia linearifolia, Moq.
Euphorbia dracunculoides, Lam.

Viola cinerea, Boiss.

Polycarpæa corymbosa, Lam.

Herbage for Cattle.

Of grass especially cultivated or allowed to grow for the purposes of pasturage, there is none in the Jhelum tract, for all land capable of producing grass is at once placed under some kind of corn crop. All kinds of cattle are chiefly sent to feed upon the low hill ranges, or upon certain tracts of land covered with the Baer, (from a low thorny shrub to a tree of good size, *Ziziphus nummularia*, Mulla, and *Z. jujuba)* the cattle feeding on the leaves and fruit. Of such Baer jungles there are several in the Jhelum tract, made up chiefly of the Baer, but also partly of the "Kureel" and "Bakoor," with an occasional "Kekur" and perhaps rarely a few bushes of the *Grewia betulifolia*. Camels manage to pick up their fodder, (which must necessarily chiefly consist of the *Saccharum spontaneum*,) from the islands on the river. This, however, except in a young state, seems to be too hard a grass for cattle generally. Green corn is even cut for horse fodder, and should a cavalry regiment be stationed at Jhelum, the grass-cutters of the regiment have to go down the river as far as Russool, (which is situated fifteen miles further down, on the opposite bank of the river,) for the purpose of obtaining grass.

The grass-cutters of the usual inhabitants get what grass they can along the roadsides, between the edges of fields, or footpaths, &c. and that which is chiefly collected is the Doob, *Cynodon Dactylon*, Pers.

Pennisetum cinchroides.

Aristida depressa, Retz.

Digitaria sanguinalis.

Panicum Petiverii, Trin.

Panicum procumbens, Nees.

Panicum antidotale, Retz.

Aristida murina, Cav.

Lappago biflora.

Eragrostis Poæoides, Beauv.

Dactyloctenium Ægyptiacum.

Koeleria phleoides, Pers. This may be called the cold weather grass, as it flowers as early as February, and if cultivated, might be of great use as fodder during the cold weather months.

Many other grasses are met with, but the above are the only kinds found generally in the tract. The others in damp and shaded localities, exist rather as botanic specimens than as herbage for cattle.

7th. Of Parasitical plants, the only one met with as yet, has been *Cuscuta reflexa*, "Akas-bel," which is in this tract supported by the "Baer," on Mt. Tilla by the "Bakoor," and at Choya-siden-sha by the "Angeer." (*Ficus caricoides*, Rox.)

The Tract of the low Hill ranges.

Under this head are included the Bukrala, Ratian, Surafur and Kharian ranges of hills. Their geology, physical characteristics and vegetation are similar, and their average height may be considered to be from 1,000 to 1,200 feet above the sea level. Mori Peak, the highest of the Kharian range, is 1,400 feet, and is situated in the centre of that range. Mt. Tilla the most westerly of the Ratian range, is 3,200 feet. The botany of the latter, will, however, be considered by itself hereafter.

These hills are more or less covered with a jungle of low trees and shrubs, besides a few grasses and other herbs. On the whole, however, they present a barren aspect, being covered with a dried-up clay and stony soil, lying chiefly upon sandstone, but here and there upon boulders, and broken up extensively by deep ravines with sandy bottoms. However, in some little solitary shaded nooks, where loamy soil has accumulated, and where there is moisture from some spring, we come upon a herbage of a luxuriance only to be met with in a tropical climate.

The vegetation upon these hills affords pasturage for immense flocks of goats and sheep chiefly, but also of many camels and cattle, which feed upon the blossoms and tender shoots of the shrubs rather than upon the grass, the latter being very scarce in proportion to the former.

This jungle, besides yielding fodder for the cattle, supplies the main part of the firewood for the surrounding population.

The chief sources of firewood in the Jhelum tract, are—

1st. Wood obtained from the river Jhelum by women wading into its shallows, and picking up the wood that has been brought down from the hills, but which is so dense with the amount of water that it contains, that it sinks to the bottom. The women

wade out in large numbers at a time, and feeling with their toes for the bits of wood, pick them up and raise them with their toes. The wood is then placed in baskets and afterwards dried in the sun. This is the cheapest kind of firewood.

2nd. The large roots of trees chiefly of the "Cheer," *Pinus longifolia*, carried down with the floods of the river, but not soaked with water.

3rd. That obtained from the jungles on the low ranges of hills.

The jungle of the low ranges of hills is made up of—

Stunted shrubs of the *Acacia modesta*, Wall. "Phulai." *Capparis aphylla*, "Kureel." *Carissa diffusa*, Roxb. "Karounda." *Sageretia Brandrethiana*,* "Kohare." *Gymnosporia spinosa*, "Putaker." *Eheretia aspera*, "Chumroor" and "Kookhun."

Grewia betulifolia.

Cocculus leæba.

Periploca aphylla.

Asparagus, several species.

Taverniera nummularea, D. C.

Dodonæa Burmanniana.

These constitute the main part of it, but in some portions it may be made up of the *Zizyphus jujuba* and *Acacia Arabica*, both very stunted, with *Adhatoda vasica*, Nees, and the "Dhak," *Butea frondosa*, the last chiefly in broken ground, where also we meet with *Tecoma undulata*, "Loora." On the higher localities on the ridges of Mt. Tilla, we may pick up shrubs of *Olea Europea*, Cow.

The under-shrubs and herbs growing with the above jungle are;

Salvia pumila, Benth. which in many places covers the ground like a grass and is much sought after by sheep.

Boucerosia aucheri, "Choonya," a very characteristic plant, springing up from the roots and among the stems of the larger shrubs. The natives collect it and use it largely as a bitter tonic.

Solanum gracilipes, Jacq.

Linaria ramosissima, Wall.

Commelyna communis, L.

Commelyna Bengalensis, L.

Polygala arvensis, Willd.

* *Sageretia Brandrethiana*, called after Arthur Brandreth, Esq., Bengal Civil Service.

Polygala Vahliana, D. C.
Astragalus multiceps, Wall.
Pupalea lappacca, D. C.
Dipteracanthus prostratus, Nees.
Ærua javanica, Juss.
Ballota limbata, Benth.
Allium rubellum, Bieb.
Cleome linearis, Stocks.
Abutilon Indicum.
Sida rhombifolia, L.
Triumfetta angulata, Lam.
Besides the above, we have several grasses:—
Cynodon dactylon, "Doob."
Melanocenchris Royleana, Nees.
Pennisetum Cinchroides.
Aristida depressa, Retz.
Eragrostis Cynosuroides.
Dactyloctenium Ægyptiacum.

In some ravines *Saccharum Munja* and *S. spontaneum* and not uncommonly also *Nerium odorum* are to be met with. The last plant is, however, more common where these ravines open out into the nullahs. It is not to be found on the banks of the river, in its whole course from the fort of Mungla to Shapore, but seems to prefer the hills, as no sooner does one get into the hilly country above Mungla, than it is met with in large quantities on the river bank.

Except during the rainy season, water is not obtainable in these low ranges of hills, unless it be from Bunnees, which are reservoirs of water formed more or less artificially in connection with springs. To these all the cattle are brought from miles round, as the Bunnees are few in number and generally at some distance from each other. The inhabitants of this tract always use their water in preference to any other. In nearly all these Bunnees we have a form of aquatic vegetation peculiar to them. In those of some depth we have *Nelumbium speciosum*, the fruit of which is greatly relished by the natives. In most of them, we have *Nymphæa cærulea, alba?* and *pubescens*, with *Polygonum barbatum*, L. and *Persicaria*, besides—
Sagittaria cordifolia, Roxb.
Marsilea quadrifolia.

Potamogeton crispus, L.
Juncus bufonius, L.
Celsia Coromandeliana, Vahl.
Rumex acutus.

In their vicinity, the vegetation is usually of much greater luxuriance than that of the surrounding country.

Tract of Ravines.

This constitutes that portion of the country between the Ratian and Bukrala ranges; as also that to the north of the Bukrala and Salt ranges. It consists of plain ground broken here and there by low elevations, and cut up in every direction by ravines. The average altitude of these plains about Chuckowal and Tullagung is 1000 feet above the sea level. Their geological formation is chiefly tertiary miocene, with little or no surface soil. The vegetation is much poorer than that met with in the Jhelum tract. The agricultural products are chiefly Bajree and Jowar, which are usually very fine, bearing heavy crops if there has been a good rainy season. Wheat is poor, and cotton also, except where cultivated in the courses of the *nullahs* or ravines in which alluvium has been deposited: the small garden plots, for they appear little or nothing more, are then watered from wells sunk at a little distance from the bank of the nullah: this kind of cultivation is well illustrated, at Doomun; where seven or eight wells, with their garden plots of cotton and tobacco are seen, on the margin of the nullah at the base of the fortress. Except near wells or bunnees or tanks, trees other than the Baer and Kekur are scarcely to be met with, and these are uncommon. From Chuckowal westwards, large and fine crops of gram, *Cicer arietinum*, with varieties of *Phaseolus* are raised, this country supplying much of the gram to the rest of the Punjaub.

To the west of Chuckowal the land spreads out into much more extensive plains, and is much less cut up by small ravines than that to the east of it, although traversed by many large nullahs, upon the banks of which good fodder is obtainable, and where we find the *Dalbergia Sissoo*, Sheshum, growing in its natural soil and producing timber by no means to be despised: especially near Tullagung.

Herbage is not procurable for cattle except on the low ranges of hills, and in the ravines that run through this tract, or on the banks

of the nullahs already spoken of, where *Saccharum spontaneum* is frequently to be found growing in great luxuriance, vying with *Nerium odorum*.

During the hot weather the cattle of the zemindars suffer greatly from the want of good water, and their owners have recourse to building mud tanks for collecting water during the rains: to these, as Flemming says, "Men and animals go for drink indiscriminately." Tanks not fed by springs have, apparently for this reason, no vegetation in them, unless it be species of *Pistia*.

The uncultivated land of this tract has a vegetation very similar to that described as existing upon the low range of hills; with this exception, that in the ravines and beds of nullahs, we meet with the "Dhak" *Butea frondosa*, in much greater quantity, in some spots even constituting a jungle, as at Booroo jungle on the Bukrala nullah.

The piece of land, however, on which this jungle grew, has been to a great extent, reclaimed. Near Tullagung are hedges of the *Cactus Indica* growing in great luxuriance.

The Colocynth, *Cucumis Colocynthis*, "Indraun," covers the hard sun-baked ground throughout the whole of the hot weather: *Limeum Indicum* is very common.

The Jelallpore Tract

Constitutes that portion of the district that lies between the river Jhelum and the Salt range, from where the Surafur hills come down upon the river, to the town of Pind-dadun-Khan. This tract consists of an extensive plain, spreading from the base of the salt hills to the river, with but a very slight incline towards the latter. The plain consists of a rich alluvial deposit, except at the base of the hills, where it is made up of a mass of boulders, shingle and debris. Interspersed throughout it are tracts of soil impregnated largely with saline matters: the last increasing in amount as we approach Pind-dadun-Khan. In some places torrents from a higher level than that of the salt, deposit loam upon certain lands close under the salt range, making them the richest in the whole district. To facilitate the deposition of the loam, as well as to prevent its being carried off by rains after its deposit, ridges of earth of about eighteen inches in height are thrown up round the fields.

Over this tract wells are very plentiful, with a large supply of water

at a little depth, but the water except in close proximity to the river is saline, and decidedly more so the further west we go.

Where the well water is not greatly charged with saline matter, it is largely used for irrigation, and where the river presents a high bank its water is also raised for the same purpose. At Baghanwalla a small stream from the hills is nearly used up for irrigation.

The chief crops irrigated are,—sugar-cane, rape and cotton.

The crops are the same as those in the Jhelum tract, but the cotton on the whole, is very much finer and the produce much greater.

Sugar-cane is cultivated as a field product and is of fine quality.

Rape "Surson." Of this, large quantities are cultivated and exported, as also of Til, *Sesamum Indicum*.

Rice is occasionally raised on the islands on the river and on land that is frequently flooded.

Indigo is occasionally grown and brought into the market.

Of Trees, the "Kekur," and in greater numbers, its variety the cypress, grow in much greater luxuriance than elsewhere, as also do the "Bore" and Pipul, *Ficus Indica* and *F. religiosa*. In this tract we meet for the first time with *Salvadora oleoides*, "Pelu." It is confined, however, in the most easterly part of this tract, to the immediate base of the hills.

Also close to the base of the Hills, growing in its natural state, as well as introduced into some of the fields near Jelallpore, we have *Moringa pterygosperma*, Sohounja.

The barren soil alluded to as occurring amidst the cultivated land, is covered with a low, shrubby jungle consisting of *Caroxylon fœtidum*, *Moq*, *Anabasis multiflora*, *Moq*, *Suæda fruticosa*, L., the first of which chiefly alone, but not unfrequently with the two latter, is largely burnt to yield Sugee-muttee, a coarse carbonate of soda and potash. In this tract, however, but little is made in proportion to that produced in the tract we shall next speak of, or that of the district of Shapore. Except near the river's bank we have scarcely any of the grasses met with in the Jhelum tract, their place being now occupied by *Æluropus repens*, and *Cressa cretioa*.

At Pind-dadun-khan which may be considered the end of the Jelallpore tract, we have very rich alluvial soil supporting some fine trees of *Tamarindus Indica* "Imlee Umlai."

Syzygium Jambolanum, "Jaman."

Phyllanthus Emblica, "Howla—Aowla."

Feronia elephantum, "Khair," which bears fruit.

Mangofera Indica, Mango, highly cultivated in some of the gardens.

Phœnix dactylifera, "Khujjoor," which, although we meet with occasional specimens on the river's bank between Jhelum and this place, only here occurs as naturalised, producing fruit in some quantity, and tolerable in quality.

Guilandina Bonducella, "Kut-karounja," apparently naturalised, is found in profusion near gardens.

Besides the trees mentioned, we have all the others enumerated as occurring in the Jhelum tract, and all, without exception, having a far finer appearance: this is due no doubt to the depth and richness of the alluvial soil, with a sufficiency of moisture.

From this point passing westwards we enter upon the tract of the salt plains, viz. the plains that lie between the river and the salt range to the west of Pind-dadun-khan for about 30 to 40 miles, that being about the extent of the Jhelum district.

Tract of the Salt Plains.

In this division we have a tract of country all but a dead level, and in which the cultivation is restricted mainly to the margin of the river, the remainder being near the base of the hills, while between the two, the land is a jungly waste, owing to the excessive impregnation of the soil with saline matter. Through the whole tract, except close to the river's bank, the well water is so bad, that for water for their own use and for their cattle, the inhabitants are dependant on that collected in mud tanks; and for the watering of their crops on rain; except where, as at Keutha, a stream of fresh water comes down from the hills; and in that case it is necessarily used for irrigation. Hence a poor and scanty crop of Bajree and Jowar with a little cotton may be considered the chief products of this tract. Along the banks of the river, however, wheat and barley, with the above, and the oil-seeds are largely cultivated, and yield good crops.

On alluvial soil, as on the banks of the river, or where cultivation is carried on, the Cypress variety of the Kekur, the Baer and the Date-palm may be considered the characteristic trees.

On the land incapable of cultivation we have a jungle consisting of stunted trees, bushes and shrubs, viz.—

Tamarix Indica, "Furas."

Salvadora oleoides, "Pelu."

Prosopis spicigera, "Jand."

Acacia modesta, "Phulai."

Capparis aphylla, "Kureel," with *Acacia Arabica* and its variety *Cupressus*.

Suæda fruticosa, L.

Anabasis multiflora, Moq.

Farsetia Jacquemontii, Hf and T.

Saccharum spontaneum with *Aëluropus repens*.

Immense herds of cattle are pastured in this jungle, and their fodder seems to consist of the abovementioned shrubs and bushes more than of either of the grasses: the former when in full growth being apparently too hard for them, while the latter only springs up in any quantity during the rains, or as long as moisture lasts in the soil.

During the month of May and when the fruit of the "Pelu" is becoming ripe, whole villages of people go out and stop in the jungles, living solely upon it. This occurs more especially in the Shapore district, where a much greater extent of the jungle exists which is there called the Baer. Men and animals suffer in these jungles extremely from the want of good water, for what they drink is solely that collected from falls of rain.

The fruit of the "Jand" *Prosopis spicigera* is largely used by the natives as a vegetable diet, especially before it reaches maturity, and is considered highly nutritious.

From the "Furas," *Tamarix Indica*, both galls and manna are said to be obtained; the galls are very poor; of the manna none was met with by myself on this tree.

Where the gorges of the salt range open out from the hills into the plains, and shingle, sand and a little soil with a large amount of saline deposit, occupy the intervals between the boulders, we come upon *Rhazya stricta*, Dcne, forming a shrubby jungle in itself. It spreads also beyond, to soil that is capable of producing other plants.

On the beds of the saline streams that make their exit through these gorges, *Rumex vesicarius* grows in great abundance.

From the gorges just mentioned, we naturally enough pass on to the salt range, of which we will now treat.

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Hills of the Salt Range.

In ascending through the gorges, on the red marl of the salt strata, we meet with two species (undescribed) of *Pluchea* growing in great magnificence and presenting the characters of tree shrubs. These are particularly characteristic plants of the marl.

As we rise still higher, passing above the salt strata, we come upon the "Pupper," *Buxus sempervirens*, occurring in great quantity, more particularly at the head of the gorge at Keutha, and producing wood of good quality which, however, is not used for any particular purpose by the inhabitants. The branches are, however, largely used for thatching, for which purpose the durability of the leaves renders them well fitted.

On the summit of the range, which averages 2000 feet above the plains on the south, we come upon a jungle very similar to that existing on the low ranges of hills, but consisting largely of the Olive, Cow. with *Prosopis spicigera* and an occasional *Acacia Eburnea*, in addition to the plants common in the latter. There is, however, none of the *A. Arabica*. Besides these, characteristic of the range, we have *Dodonæa Burmaniana* in great quantity.

Forskolea tenacissima.

Astragalus leuco-cephalus, Benth.

Barleria cristata.

Lindenbergia polyantha, Royle, with *Allium rubellum* and several species of *Asparagus*, viz., *racemosus*, *curillus*, &c.

On the southern aspect of the range, from its base to its top, passing up the gorges, we have *Salvadora oleoides* forming a large portion of the jungle. But the moment we rise to the actual summit, and bend our way northwards, not a single plant of it is to be seen, its distribution being limited to the west of the Surafur hills and the south of the salt range.

These jungles supply large quantities of fire-wood but no timber whatever.

The Plains on the Salt Range.

These are alluvial plains occurring interspersed throughout the hills, many of them consisting of a limestone formation, and having occasionally streams of fresh water running through them. These streams in general make for the river Jhelum, and entering the salt strata, become impregnated with saline matter, which they deposit on

the salt plains beyond. Through these they are not able to cut their way, but are absorbed by the soil long before they reach the river, and thus instead of aiding in its irrigation, render it incapable of producing a vegetation useful to man.

The plains *upon* the salt range yield splendid crops of wheat and barley, especially the former, as also all the other crops of the Jhelum tract, except sugar-cane. In addition to these we have in the fields, as at Kulakahar and Choya-siden-sha, opium largely cultivated, as also the rose; from the latter an immense quantity of rose water is distilled, its manufacture being lucrative.

Irrigation is not common, but where streams supply water, the cultivation is laid out in terraces, walled round, to aid in a free distribution of water and to prevent the washing away of the soil.

Where these streams do not exist, water is scarce, wells being sunk generally through rock and to some depth. Hence the fields are solely dependant upon rain, and should a dry season occur, a complete failure of the crops is inevitable.

On the alluvial soil bordering the streams above mentioned, we have *Morus alba*, forming fine timber, especially at Kulakahar; also *Rhus integerrima*, Wall.; "Kuker*" in great magnificence both at the last place and at Choya; as also *Acacia modesta*, "Phulai," attaining its greatest girth, with *Vitis vinifera* (naturalised) trailled to the top of the highest trees. The Sissoo is rare, although the largest tree of the sort I have ever seen, is at Kutas.

Besides the above—

Salix Babylonica.

Zizyphus vulgaris, "Jujuba."

Ficus Indica and *religiosa* with *Melia Azaderach* are common.

As shrubs on the hilly ground, we have generally those met with on the low range of hills, mixed, however, largely with the Olive and *Dodonæa*, and not unfrequently *Gardinia tetrasperma*, Roxb.

As weeds in the fields, the most characteristic are—

Salvia Moorcroftiana, Wall. "Kalather," met with over all the fields.

* Called also Kuker-singa, because of the horn-like protuberances that are developed upon its branches.

Edwardsia, new* sp. "Koon," said to be poisonous to cows—in great quantity at Choya.

Eremostachys Vicaryi, Benth. not common.

Gypsophila Vaccaria, L. is very common in the corn-fields at this elevation, growing along with the corn-crop.

Lithospermum arvense.

Psoralea corylifolia, L.

Gnaphalium luteo-album.

Avena fatua, L.

Lepidium draba.

Neslia paniculata.

Alhagi Maurorum.

In moist damp soil near fresh water, we have—

Herpestis monniera.

Stachys parviflora, Benth.

Samolus Valerandi, L.

Cyperus mucronatus, Roth.

Apium graveolens, L. with

Cynodon dactylon, in great profusion.

Some fine grazing for cattle is to be had along most of the fresh water streams.

Mount Tilla.

The most westerly of the Ratian range of hills, is situated 17 miles due west from the town of Jhelum. Its height is 3,277 feet above the sea level. On its Eastern and Southern aspects it presents a scarped face with a direct ascent of nearly 1500 feet. The usual route to its summit is by the western side from near the village of Bagree.

It is covered with a low shrubby jungle at its base, corresponding to that met with on the low ranges of hills, but as we ascend to about 1,200 feet above the sea level, the vegetation gradually assumes a character not found in any other part of the district, and in no way analagous to that at a similar height in the salt range. This is owing to the total absence of the salt rock, which in this hill does not present itself *upon the surface.*—A saline stream makes its escape from the west side of the hill near the village of Bagree.

* *Edwardsia Hydaspica*, (Edgw.).

None of the characteristic plants of the salt marl have as yet been discovered on this hill, nor a single specimen of the *Salvadora oleoides*.

The first change that we notice in the vegetation as we ascend the hill, is that *Acacia arabica* in the form of stunted bushes gradually disappears, so that it is quite absent at about 1,200 feet. Secondly, grasses become more numerous and present a greater amount of verdure than we have as yet seen, except upon the plains on the salt range.

These grasses are—

Anthistiria anathera, Nees.
Cymbopogon Twarancusa, Roxb.
Andropogon annulatus, Forsk.
Heteropogon contortus.
Crysopogon serrulatus.
Apluda aristata, Roxb.
Panicum Petiverii, Trur.
Pennisetum cinchroides.
Panicum antidotale, Retz.
Aristida depressa, Retz.
Aristida murina, Cav.
Lappago biflora.
Cynodon dactylon, Pers.
Digitaria sanguinalis.
Eragrostis poæoides.
Dactyloctenium Ægyptiacum.
Melanocenchris Royleana, Nees.

The first six are the characteristic grasses of Mount Tilla, and cover it with a splendid herbage for cattle, from its base to its summit. This hill with its lower ridges may be considered as affording the best runs for cattle in the whole district.

Phaseolus trilobus, Ait., exists in profusion at the base of the escarpment on the east side of the hill, creeping through the long grass and matting it together.

Lantana alba, commences about an altitude of 1,000 feet, becoming more common the higher we ascend, and characterising the vegetation of the hill with its lovely white inflorescence.

Dalbergia Sissoo, "Sheshum" occurs upon the northwest slopes in

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one or two places, as young trees of from 4 to 5 years' growth: here and in some ravines of the Surafur hills it seems to be rapidly becoming naturalised.

Dodonæa Burmaniana—"Syna," covers the hill from base to summit on its western slope, forming a remarkably characteristic jungle, (of which there is the analogue in the higher parts of the salt range), and along with it on the same slope, choosing as it were a similar locality, the "Khujjoor"* *Phœnix Sylvestris* which produces fruit in abundance.

Bambusa arundinacea, "Bansa"—growing in great luxuriance in a valley that looks to the south, closed in on its other three aspects by the high ridges of Mt. Tilla. Here the sun seems to have but little effect and abundance of moisture exists. Along with it, we meet, for the first time, with *Rhus integerrima*, Wall. "Kuker," presenting some fine trees and fair timber; as also *Moringa Pterygosperma*, and *Bombax heptaphyllum*, L. "Sembul," the last shewing magnificent inflorescence during March. Of this last, there are some fine trees in the valley half way up Mt. Tilla, on the usual road from Bagree.

At 1,200 feet we meet with *Physorynchus Brahuicus*, Stocks, in profusion. On the low range of hills it is rarely to be found.

Plectranthus rugosus, Benth. commences about the same height and forms a dense mass, through which it is nearly impossible to make one's way, and affording excellent cover for chuckoa; it is greedily fed on by cattle and sheep.

Plumbago Zeylanica, begins now to shew its fine white blossoms, and *Grislea tomentosa*, "Tawa" in the clefts of the rocks, presents an inflorescence only equalled in splendour of colour by that of the *Bombax* or the *Butea*. This is only to be met with, however, on the eastern face of the hill.

Olea Europea, Cow. may be said to commence at 1,500 feet, although found occasionally below this altitude; it is in this latter case but a very small shrub. Indeed at the height abovementioned it is but a shrub, assuming however rapidly the characteristics of a tree. It does not attain its maximum growth under 3,000 feet. On the top of Mt. Tilla there are some very fine trees of it growing through the building of the fakir's temple.

* The true date palm and the *P. sylvestris* are both called Khujjoor by the natives.

At the same height, species of *Grewia* viz. *G. oppositifolia, villosa* and *Rottii*, begin to appear as shrubs, but as we ascend, they put on their true tree form.

We now come upon great tufts of grass, as it were, hanging from the crevices of the rocks and covering the steeper sides of the hill; viz. *Eriophorum comosum*, 'Babila," highly valued for rope-making: the rope made from it is chiefly used for tying the earthen dishes upon the Persian wheels. Exposed to continuous wet and in constant use, a rope, the thickness of two fingers, will last during a whole year, if properly twisted.

We now have, at 2000 feet, *Mimosa rubicaulis*, in some quantity. All the good timber of this tree seems to have been cut down by the villagers and shepherds. They have no name for it except "Kekur."

Rhamnus Persica, is not uncommon on this hill, but is more common on one of the ridges of the hill to the south-west.

Rottlera tinctoria, Roxb. "Rooin, Rolee, Kamela"—exists in great quantity in the narrow valleys leading down from the main hill. Its seed vessels are highly valued as a vermifuge, and are also used to prepare a red dye.

Here also, but in one locality only, viz. on the northern ridge of the hill, we have *Forskolea tenacissima*, a characteristic salt range plant found on strata much superior to that of the salt. And very common over the whole hill is *Melhania abutiloides*, Arn.

Hibiscus Gibsonii, Stocks, occurring in some quantity in the valley through which the road leads, between the southern escarpment and the main hill.

Boerhaavia repanda, Willd., in great luxuriance along the summit of the face of the eastern escarpment.

Vitis carnosa, Wall., with *Cissampelos Pariera* are to be met with all over the hill. The latter, however, prefers the western aspect.

Colebrookia oppositifolia, Sm., at about 2,500 feet of elevation, forms a bushy thicket; mixed with it, *Hamiltonia suaveolens*, Roxb. is very common. *Barleria cristata* begins to shew its lovely pink flowers, gradually spreading over the whole hill.

Tetranthera Roxburghii, Nees,—not unfrequently met with as a tree shrub.

Kydia calycina, Roxb., chiefly as a shrub, but one or two good trees exist upon the hill. From the number of stumps to be found scat-

tered over the hill, it would seem that this tree has formerly existed in large numbers. It is very characteristic, more especially during the winter, when enormous bunches of dried flowers are seen hanging from it, the tree itself being deprived of all its foliage.

Dæmia extensa, R. Br. and *Gardinia tetrasperma* are not unfrequently to be met with over the cliffs.

Asplenium Dalhousiæ is very common in the nooks and corners of the rocks where moisture collects and affords a damp soil.

Above 2,500 feet we come for the first time upon a species of the *genus Arum*, most likely *Typhonium* (?)

Although at 1,500 feet on the rock above the fort at Mungla, *Amphicoma Emodi*, Royle, is to be found in great luxuriance, I have not obtained it on Tilla under 2,500 feet.

We now see the eastern face of the main hill covered with a shrub producing enormous palmate foliage, but as I obtained neither its fruit nor flower, I can only say that it is most likely to be a *Sterculia* (?)

A single specimen of *Cordia vestita* (?) Hf and T. occurs upon the margin of the tank on the southern shoulder of the hill. From its situation by the tank and its being the only specimen of its kind, it has most likely been introduced.

Adiantum caudatum occurs now, in great abundance in damp localities.

Celtis Caucasica as a small tree is here common, shewing tolerably good sized timber.

At 3,000 feet we come upon the *Convolvulaceæ* in great luxuriance, viz., *Pharbitis nil*, *Ipomœa muricata*, Roxb., and. *I. pilosa*, Choisy, with *Campanula canescens*; the last only in damp localities, where also we obtain that beautiful grass *Batratherum molle*, Nees.

Galium aparine with *Cheilanthes farinosa*, in the recesses and clefts of the rocks.

On the very summit we have *Geranium rotundifolia* and *G. lucida?* being the first of this genus as yet obtained, with *Galium aparine*, which indicate a great altitude; besides *Phyllanthus niruri*, *Clematis Gouriana*, *Jasminum grandiflora* and *Vitex negundo*, L.

On the summit of the hill we have a tolerably level piece of ground, partly cultivated by the fakirs, with a miserable attempt at a garden planted by Government; the remainder consists of a mass of jungle. Here we have a temple belonging to the fakirs, with their burying places

scattered over the top of the hill; a small house belonging to Government for the benefit of travellers; and lastly a magnificent tank fed by numerous channels running towards it, from every direction. Except from rain, neither on the summit nor indeed on any other part of the hill, is water to be had, (except from the tank already mentioned on the southern shoulder of the hill). But I have no doubt that if a well were sunk in the valley between the eastern escarpment and the main hill, water would be found at no great depth.

The vegetation on the summit is curiously varied. A splendid specimen of the *Pinus longifolia*, "Cheer," bearing fruit, was introduced 30 years ago by the *Fakirs*. The olive occurs in great luxuriance; the "Khujjoor," *Phœnix sylvestris*, yielding fruit, and the *Ficus Indica*, "Bore." The co-existence of the above four kinds of trees all in full vigour tells us that we must be in a most genial climate; one in which neither the severity of the hot weather nor the dryness of the atmosphere, is too great for the *Pinus longifolia*. Nor does it seem that the intensity of the cold in the cold weather is so extreme that the *Ficus Indica* should not but rival some of the finest specimens of its kind to be met with in the Jhelum district. Together with these two forms we have the "Khujjoor," *Phœnix sylvestris*, in its native luxuriance, with the olive and the pomegranate, *Punica granatum*.

For further information relative to the district of Jhelum, see—

Asiatic Society's Journal for 1848. The camp and battle field of Alexander and Porus, by Captain James Abbott, Bengal Artillery.

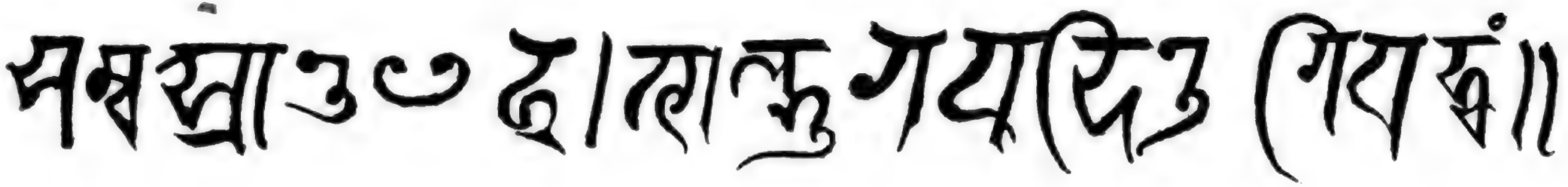
In ditto for 1849, Diary of a trip to Pind-dadun-Khan and the salt range, By Andrew Fleming, M. D., Asst. Surgeon, 7th N. I.

In ditto for 1850, Descriptive notice of the Jhelum district by L. Bowring, Bengal Civil Service.

In ditto for 1853. Report on the Geological structure and mineral wealth of the salt range in the Punjaub, &c. &c. &c., by Andrew Fleming, M. D., Edin., Asst. Surgeon, 7th N. I.

Survey of the Jhelum River by Charles Foster, Lt. I. N. in the Punjaub Govt. Reports, No. VI. for 1861, published by Govt.

REDUCED FACSIMILE OF THE DATE OF THE BENARES PLATE.



FACSIMILE OF THE DATE OF THE DIGHWA PLATE.

On a Land-Grant of Mahendrapála Deva of Kanauj.—By Bábu Rájendralála Mitra, *Corresponding Member of the German Oriental Society.*

In 1848 Mr. J. W. Laidlay, then editor of the Journal, published a translation, by me, of a Sanskrita inscription incised on a large slab of copper which had been presented to the Society by the late Col. J. C. Stacy. It was the record of a gift of land by a prince of the royal house of Mahodaya (Kanauj), and remarkable for being surmounted by a figure of Bhagavatí and the genealogy of the princes named, cast in relief on a tablet of brass. A counterpart of that document has lately been found in the village of Dighwa Doobaneshar, in the Pergunnah of Manghee, Zillah Sarun. Mr. P. Peppe, to whom I am indebted for a transcript of the record, was informed that "it was dug out of a field some years ago by a Dighwaët Brahman of Chhapráh;" but Mr. James Cosserat of Motihári, who has favoured the Society with a carefully prepared facsimile of the monument, learnt on enquiry of the owners that "their ancestors found it in a temple in a ruined Musalman fort in that village, but it was so long ago that they did not seem to have any distinct tradition about it, nor to be able to give any authentic information on the subject." The weight of the plate, according to him, is thirty seers. The surmounting tablet he says "is a casting apparently of iron with a mixture of copper, and the letters raised. It appears of older date than the lower portion of copper engraved. There is a small figure of an idol at the summit; the part left uncopied is a cornice and the idol itself (very indistinct) which I have found it beyond the power of the natives here to take an impression of. The whole of the inscription, however, has been got. The upper portion has been roughly but securely joined to the lower or larger and engraved part. The plate has suffered from fire, the traces of which appear in the indistinctness of parts of the impression."

The size of the monument, the style of the character incised on it, and the tablet and the figure of Bhagavatí which surmount it, bear so close a resemblance to those of the Stacy plate that the two documents seem to have been prepared by the same artist, and inscribed by the same engraver. The genealogy of both begins with the same prince, Devas'akti Deva, but while the Dighwa plate ends with the sixth descendant Mahendrapálá Deva, the Stacy record carries it

down to Vináyakapála, brother and successor of Bhoja Deva who was the immediate heir of Mahendra.

The subject of the grant in the Stacy plate is the village of Tikkarika, in the district of Benares, that of the Dighwa record the village of Pámayaka, in the subdivision of Talayiká, of the district of Srávastí.

The date of the Dighwa grant is "the 7th of the waxing moon in the month of Mágha, Samvatsara 389," the last figure being open to question. In my first reading of the Stacy plate I took its date to be "the 6th day of the dark half of the moon in the solar month of *Phálguna* Samvatsara 65;" the word "solar" being deduced from an indistinct letter which I took for रवि "light" or the "sun." In the redecipherment* of the record published in the XXXI. Vol. of this Journal (p. 15) Professor F. E. Hall has dismissed the figures by stating that after the word Samvatsara "follow two unrecognized numerals, denoting a dynastic year, and an indistinct compound character of unknown significance. Further on the day of the semilunation is expressed by a single numeral. It is the same as the first of the two just spoken of." On re-examining the document with the light of the Dighwa plate, I feel disposed to take the first figure for an ancient 4, being somewhat similar to the same figure in the Western caves and on coins. The second is an imperfect or partially effaced cypher, or possibly an 8, but in that case very unlike the same figure in the Dighwa plate; and the indistinct letter after it, which looks very much like a *bhra* and no figure, having the perpendicular line of the long vowel after it, a 9. The figure for the semilunation, being the counterpart of the first figure of the year, must of course be read as 4, making the date "the 4th of the wane in the month of Phálguna, Samvatsara 409." This would bring the record 19 years after the Dighwa plate, which would be in no way too much for the latter portion of the reign of Mahendrapála, the whole of that of Bhoja and the beginning of that of Vináyakapála. The last figures, however, being in both the documents very doubtful if we take them for initials

* It is remarkable that in this so-called "redecypherment" the only emendation of any value is the relationship of Vináyaka Pála to Mahendra. The learned Professor makes him a son, whereas my reading made him a grandson. For the rest the new reading adds little to our knowledge of the document beyond the fact of there being some obvious inaccuracies of spelling in the original which in my reading I had corrected without note, and a few mis-prints in my transcript which had escaped my eyes. The "redecypherment" did not, even in the opinion of the Professor, render a re-translation necessary.

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of some now unknown words the dates would read 38 and 40, 45 or 48 as we accepted the second figure of the Stacy plate to be a cypher a 5, or an 8, giving an interval of 2, 7 or 10 years between Mahendra and Vináyaka. I annex facsimiles of the two dates, in order that others may be enabled to solve them more successfully than I have been able to do.

The word *samvatsara* means simply a year and not an era, it is impossible therefore to ascertain to what particular era allusion has been made by the two plates. Had the era of Vikrama been meant, the word *samvat* would have been preferred; besides the character of the plates is too modern to entitle them to a place in the 4th century of Vikrama. If the Ballabhi samvat be assumed the date of the Dighwa document would be carried back to (318 + 389 = 707) the beginning of the 8th century, which would lead to the anachronism of making Devas'akti and his successor contemporaries of Harshavardhana and co-sovereigns in Kanauj in the beginning of the 8th century; even if it could be shewn that the Ballabhi samvat had extended so far to the north-east of Guzerat—the place of its origin—as Kanauj. Again, if the Harsha era be assumed,—a very likely era being a purely Kanauj one—the date of Mahendra would be brought to the end of the 10th century, when Kanauj was for certain under the Tomaras. Under these circumstances I am compelled to take the era of the records to be a local or family one, the zero of which it is impossible now to determine. This does not prevent us, however, from ascertaining the probable period when the princes under notice flourished in India. Govindarája, sovereign of Ráshtrakúta in the south Marhatta country, in a donative inscription dated S'aka 730 = A. D. 808, states that his father Paura had once entered Márwar at the head of a hostile army, and "conquered Vatsarája, who had been intoxicated with the wealth of the king of Gauḍa, which he had seized." This Vatsarája was, we suppose, the second potentate of our list and not a prince of Marwar which he is nowhere said to have been, though he was defeated in that country. There is ample testimony to shew that Marwar and a good part of Malwa was, at the end of the 8th and the beginning of the 9th centuries, under the sovereignty of the Kanaujites, and it is more probable that a Kanauj king, in the zenith of his power, should extend his arms as far as Gauḍa on the one side and Malwa on the other, than that a prince

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of Marwar should cross the territories of the Kanauj kings in quest of "the wealth of Gauḍa", which could not have been at any time so great as that of Kanauj, notwithstanding the martial successes of some of the Pála rájás of Bengal, who at one time extended their conquests as far as Benares. It is to be admitted that the name Vatsa has been borne by several kings, and that according to Mallinátha and Somadeva, a country, a town, and even a race of men have borne the same title, but the inscription under notice distinctly alludes to a king Vatsarája who conquered Gauḍa and not to a "king Vatsa" (Vatsa rájá)—and it is evident that at the time when the said Vatsarája lived, the conquest of Gauḍa from the west could be possible only to a Kanauj king, and therefore we may in this instance from the identity of name assume the identity of person. If this assumption be admitted Vatsarája must have lived about the end of the eighth and the beginning of the ninth century, at the usual average period of eighteen years to a reign, from 796 to 814, his predecessor Devas'akti, the founder of the dynasty, commencing his reign from 775-76. According to this calculation the several princes will stand as follow:—

Devas'akti A. D. 775-776.*
Vatsarája, son of D., 796.
Nágabhatta, son of V., 814.
Rámabhadra, son of N., 832.
Bhoja I., son of R., 850.
Mahendrapála, son of B., 868.
Bhoja II., son of M., 885.
Vináyakapála, son of M., brother of B. II., 900.

This table, however, has to be adjusted with reference to the date of the Stacy plate, which places an interval of, at the outside, only 19 years between Mahendrapála and Vináyaka. And if we provide for it by reducing the reign of Bhoja II. to eight years, we shall bring him to the middle of the eighth decade of the 9th century and make him synchronous with the Bhoja of Gwalior, with whom he was most probably identical.

The Tomaras assumed the sovereignty of Kanauj about the end of the 10th or the beginning of the 11th century, we have therefore a gap of about 80 to 100 years to bridge over to complete the list of

* In the quotation of this date in my paper on the Bhojas (ante XXXII. p. 96), a misprint has converted the 776 into 779.

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Kanauj kings from Devas'akti to the end of the 12th century when the Mahomedans finally conquered the country. To fill up this gap, as far as our knowledge at present extends, we have only two names, those of Sáhasanka and Vira Siñha. The latter was the contemporary of Ádisúra king of Bengal who obtained from him five learned Brahmans to instruct his people in certain Vedic ceremonies.* This happened according to the genealogical tables and the memorial verses *(Kulapanjis* and *Kulácháryа Kárika's)* of the Bengal Ghatakas in the S'aka year 994 = A. D. 1072. The *Khiti'sávañsávalí Charita* places the event in the year 1078, and Ritter's Geography, in 1068 A. D. These dates, however, are all evidently incorrect, as they bring us to the time of Ballála Sena who lived several generations after Ádis'úra. I depend therefore on the genealogical tables for the date of the latter. Of the five Káyasthas who came to Bengal on the invitation of Ádis'úrá three, viz., Makaranda Ghosa, Dasaratha Basu and Kálidása Mitra, acknowledged service to the Brahmans and were ennobled by the king as the highest patricians (Kulinas) of his land. The other two, Dasaratha Guha and Purusottama Datta, repudiated the right of the Brahmans to call them their servants and declined to assume the servile title Dása. Purusottam with noble pride exclaimed "A Datta was never a servant." *(Datta káro bhritya naya.)* This temerity deprived them of court favour and brought on degradation to the ranks of the plebean or Maulika. The Kulina Káyasthas as well as the proud Datta have carefully preserved their genealogy. They hold periodical meetings (ekajáyis) at which all the family heralds or ghataks assemble and record the names of every succeeding generation. The last meeting of this kind was held several years ago at the house of Rájá Rádhákánta Deva when the names of the 24th generation of kulinás were duly recorded. The writer of this note is himself one of the 24th in descent from Kálidása Mitra. In some families the 26th, the 27th and even the 28th descent have already appeared, but no where later. Taking the average at 27 generations, we have at three generations to a century just nine hundred years from this date, or A. D. 964, for the time of

* The *Khiti'sa-vansávali-charita* says, to officiate at the performance of a ceremony for obviating the evil effects of the fall of a vulture on the house top which the Brahmins of Bengal knew not how to perform. The *Ghatak kárika* quoted by Rája Rádhákánta Deva makes the ignorance more general, but does not advert to the expiation for the fall of a vulture.

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the first advent of the Káyasthas in Bengal, and of the period of Vira Siñha's reign.

Of the Brahmans who came to the court of Ádis'úra the most renowned was Bhaṭṭa Náráyaṇa. He wrote the *Venisáñhára* and presented it to Ádis'úrá, on his reception by that monarch at his palace in Rámapála. He also wrote a treatise on religious ceremonies entitled *Prayogaratna* which is still extant. He purchased five villages from Ádis'úra which in the time of one of his descendants Bhabánanda Majumadara formed the nucleus of a large principality, that of the Nadia Rájás, who are his immediate descendants. Next to him was S'riharsha of the clan (gotra) of Bharadwája whose descendants form the present Mookerjea familyof the Kulina Brahmans.* No work of any note as far as we know, has been attributed to him. It seems probable, however, that he is the same with the author of the *Naishada Charita*. That work was written by a poet of Kanauj, for he prides himself at the end of his poem for having been honoured with a betel leaf by his sovereign. He also acknowledges himself to be the author of nine different works including among others a "history of the kings of Gauḍa" *(Gauḍorvíshakulapras'asti)*, "a description of the ocean" *(Arṇava varṇana)* and a refutation of some of the leading philosophical systems of the Hindus *(Khandana khanda khádya)*. Now Bengal has always been described as the Bœotia of India; its name occurs but rarely in Sanskrit literature, and it is generally called in derision a country to which the Pándavas never came even for a marauding excursion, *Páṅdava varjita des'a;* while its kings, with the exception of some of the Pálas, were poor, insignificant and unknown. It is not likely therefore that either Bengal or its kings should have been thought of as a fit subject of praise for a royal poet like S riharsha of Kashmir, or to a laureate of the proud court of Kanauj in the 7th century to whom the *Naishada Charita* and, by implication, the *Gauḍorvísha-kula-pras'asti* have at different times been attributed. The "description of the ocean" too is not a work of that kind which is likely to proceed from men in the vale of Kashmir or the inland town of Gádhipura. To the former the snows of the Himalaya would offer a more appropriate theme for song than the distant and briny ocean. These objections do not apply to the S'riharsha of Bengal. He was

* The names of the other three Brahmans were Daksha, Vedagarbha and Chhándaḍa.

born and brought up in Kanauj, and as a court poet of that kingdom he could well pride himself on the favours he received from his sovereign. He came then to Gauḍa and, to propitiate his new master, thought proper to strike his lyre in praise of his family. In Bengal he must have seen the sea, for it is on record that the five Brahmans came to Gangáságara, and that offered to him a novel and majestic theme for his descriptive powers, while to display his versatility he took up the philosophical treatise *Khandana Khanda*, which is common enough in Bengal but is scarcely known in Kashmir. This assumption, however, probable as it may appear, is, it must be admitted, founded entirely upon presumptive evidence, and must await future more satisfactory research for confirmation. At present it is opposed to the opinions of the late Professor Wilson and of Dr. F. E. Hall.

With regard to Sáhasañka I have little to say beyond what is already known to Indian antiquarians. There were evidently two princes of that name in Kanauj, one a predecessor of Harshavardhana in the 6th century and the other a distant successor in the 10th, probably a contemporary of the author of the Naíshada who is said to have recorded his biography, although that work is not now extant, and it is impossible to say to whom it referred. Its name, which is all that is left to us, is remarkable; it is *Navasáhasañka charita* which may mean "a new biography of Sáhasañka," in contradistinction to an old one; or "a biography of the new Sáhasañka," to distinguish the hero of the work from a former potentate of the same name who rivalled him in glory, or, as suggested by Professor Hall, "the biography of the nine Sáhasañkas," who, like the nine Nandas of Páṭaliputra, reigned successively in Kanauj. If the last be the correct interpretation we shall find in the eight princes of the Benares plate with a hypothetical descendant of the last of the series, just the necessary number for our purpose. In the absence, however, of the original work such speculation cannot lead to any satisfactory result.

Transcript of a copper-plate grant from Dighwa in Chhuprah.

(I.) ॐ *a*स्वस्ति श्रीमद्दोदयसमावासितानेक*b*नौहस्त्यश्वरथपत्तिसम्पन्नः*c* सडाचारात्परमवैष्णव (II.) महाराज श्रीदे*d*वग्रक्षिदे*d*वस्तस्य पुत्रस्तत्पादानुध्यातः*e* श्रीभूयिकादे*d*व्यामुत्पन्नः परममाहेश्वर (III.) महाराज श्रीवत्सराजदे*d*वस्तस्य पुत्रस्तत्पादानुध्यातः

श्रीसुन्दरी*f*दे*d*व्यामुत्पन्नः परं *g*भगवती भ (IV.) क्त महाराज श्रीनागभट*h*दे*d*वस्य पुत्रस्त्यादानुध्यातः श्रीमहीसटादे*d*व्यामुत्पन्नः परमादित्य (V.) भक्त महाराज श्रीरामभद्रदे*d*वस्य पुत्रस्त्यादानुध्यातः श्रीमदप्यादे*d*व्यामुत्प (VI.) न्नः परं*g* भगवतीभक्त महाराज श्रीभोजदे*d*वस्य पुत्रस्त्यादानुध्यातः श्रीचन्द्र (VII.) (भ)ट्टारिकादे*d*व्यामुत्पन्नः परं*g* भगवतीभक्त महाराज श्रीमहेन्द्रपालदेवः। आवस्ती (VIII.) भुक्तः*i*। आवस्ती मण्डलान्तःपाति वणयिका-विषयसम्बद्धपामयकग्रामसमु (IX.) पगतान् सर्वानेव यथास्थाननियुक्तान् प्रति *j* वासिनश्च समा*k*ज्ञापयति उपरि*l*लि- (X.) खितग्रामक्षार्वा*m*यसमेत याचन्द्रार्कक्षितिकालं पूवदत्त देवप्राप्यदयवजि*n*(त) (XI.) मया पित्रोः*o* पुण्याभिवृद्धये सावर्णसगोत्र कधुमचन्द्रगस*p* ब्रह्मचारि (XII.) भट्टपद्मेसराय*q*सवितुः कुम्भसंक्रान्तौ स्नात्वा प्रतिग्रहेण प्रतिपादित इति विदित्वा (XIII.) भवद्भिरस्मनुमन्तव्यं प्रतिवासिभिरप्याज्ञाश्रवणविधये भूत्वा सर्वेषामायस्य संज्ञा (XIV.) पनायै*r* इति श्रीम ट्टारक*s* प्रयुक्तस्य शासनस्य स्थिरायतः*t* ॥ संवत १८६ माघसुदि ७ निवद्धं ॥

a. Not legible in the facsimile, but there is space for it. The transcript prepared for Mr. Peppe has it.

b. The vowel mark is not legible.

c. The visargah is omitted in the original.

d. The vowel mark is not legible in the original.

e. In the Stacy record I took this word for *pádántakhyáta* "celebrated after the foot of another" from *pádasya* "of foot," *ante* "after" *khyáta* "celebrated," the foot standing by a figure of synecdoche for the predecessor, this mode of expressing respect for parents and elder relatives being common in India. Accordingly we see the usual address on letters from a son to his father running, "to the auspicious lotus-like feet of my respected father so and so:" *Amuka-pitá-thákura-mahásaya-s'richarana-kamaleshu*, instead of "to my father so and so, &c." In criticising this reading of mine, Professor Hall in the XXVIIth volume of the Journal, (p. 226), observed, "This epithet would signify, if any thing 'whose toes are notorious.'" He was led to the mistake by referring to his Dictionary for the compound term *pádánta* instead of the separate words *páda* and *anta*.

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Commenting on the word *pádánudhyáta* he says, "It appears, from two examples occurring in the same inscription, that it sometimes indicates merely a kindred successor, or perhaps only a successor. Where of two brothers, the elder and younger, the latter accedes to the throne in sequence to the former, the words (?) *pádánudhyáta* are, in the cases alluded to, used to denote their relation as consecutive princes" (ante XXVIII. p. 8). Colebrooke takes the compound to mean "whose feet are revered by," and that is the correct interpretation. It is used to indicate a junior blood relation and successor but never a mere successor, for the expression of respect would be uncalled for in that case.

f. The first two syllables of the name obliterated in the original. I supply them from my reading of the Stacy plate.

g. For *parama ; param* is incorrect.

h. *Bhaṭa* for *bhaṭṭa.*

i. Incorrectly engraved *Yukto.*

j. The *r* of *prati* is missing.

k. The *jna* is curiously written.

l. The *i* of *ri* is omitted.

m. The *r* of *rv* is omitted.

n. The portion commencing from पव &c. is legible enough, but of doubtful meaning. I take it for पूर्वदत्तदेवप्राप्यदाय.

o. The ◌ं of ◌ा is omitted.

p. I know not the meaning of the word *Chandragasa.* It is evidently intended to indicate a particular class of Brahmachárí.

q. पद्मेश्वराय *recte.*

r. पनया in original.

s. For भट्टारक.

t. The last word is grammatically wrong.

Translation.

Om! May it prove auspicious! Possessed, through his greatness, of innumerable war-boats, elephants, cars, horse and foot soldiers, and a thorough Vaishṇava from the purity of his conduct, was the Mahárája S'rí Devas'akti Deva. His son and successor, born of S'rí Bhuyiká Devi, was the devout follower of Mahesvara Mahárája S'rí Vatsarája Deva; whose son and successor, born of S'ri Sundarí Deví, was the devout follower of Bhagavati Maharája S'ri Nágabhaṭṭa Deva. His son and successor, born of S'rí Mahisaṭá Deví, was the devout follower

of the Sun Mahárája S'rí Rámabhadra Deva, whose son and successor born of S'rí Madappá Deví, was the devout follower of Bhagavat, Maharája S'rí Bhoja Deva. His son and successor, born of S'rí Chandra-bhaṭṭarikâ Deví, was the devout follower of Bhagavatí Maharája S'rí Mahendrapála Deva who, when in S'rávastí, thus proclaimed to the assembled crowd of the inhabitants and neighbours of the village of Pámayaka of the subdivision *(vis'aya)* of Valayiká in the district *(Mandala)* of S'rávastí. The aforesaid village with all its produce, exclusive of what has been already alienated as shares to divinities of the place, has been this day bestowed by me, for the promotion of my parents' virtue, after performance of ablution on the occasion of a conjunction of the sun with the aquarius, and to last for the period of the duration of the sun, the moon and the earth, upon Bhaṭṭa Padmesvara of Sávarṇa Gotra, a Brahmachárí of the Kauthuma —— ? Sákhá of the Sáma Veda. Knowing this, you should abide by it, and the neighbours, mindful of this order, should leave unmolested all the rights and privileges (of the donee). (This is written) for the permanency of the Edict of his auspicious Majesty. Done on the 7th of the waxing moon in the month of Mágha, Samvat 389.

P. S.—I avail myself of this opportunity to acknowledge the correctness of General Cunningham's last emendation of my reading of the Pehewa inscription. The name of Bhoja's father in that record is Rámabhadra, as pointed out by the General, and not Rámachandra as originally read by me. The great similarity between *bha* and *cha* in the mediæval Nagari and the commonness of the name Rámachandra led me into error.

The deduction, however, of the first Bhoja of that inscription being the same with the Bhoja of Gwalior is still open to question. To prove the identity the General has been put to the necessity of allowing twenty-five years to each of the eight princes of the time of Devasakti, when our antiquarians are all unanimously of opinion that the average period of an Indian reign has never been above eighteen years. The learned General himself, who holds the highest rank as an authority in all matters connected with Indian Archæology, has repeatedly in his former papers adopted the same average, and I do not see any reason to depart from it in the present instance. Had the Bhoja of Gwalior been acknowledged in any record as the son of

Rámabhadra and a sovereign of Kanauj, the case would have been different, but as it stands we have simply a Bhoja at Gwalior in A. D. 876, but nothing to shew that he was in any way connected with Kanauj or Pehewa, and we cannot therefore at once accept him to be the same with the first Bhoja of Kanauj. The name Bhoja has been so frequently assumed by Indian princes from the time of the Rig Veda to within the last two hundred years, that it cannot possibly be taken by itself as a guide to the identification of persons or dates. The identity of names in such cases can never be a proof of identity of persons. No doubt the Kanaujites had for a time exercised paramount power in Gwalior, but there is nothing to prove that Bhoja son of Rámabhadra did so, nor anything to prevent Bhoja son of Mahendrapála, being the individual named in the Gwalior inscription.

The era of the Pehewa record may be that of Harshavardhana, but that of the Stacy and Dighwa plates cannot be the same, for they place an interval of 113 years between Bhoja and his son Mahendrapála. It is worthy of remark too, that it is odd, that the father and son should adopt two different eras.

General Cunningham observes that the Pehewa record as published by me comprises portions of two separate inscriptions and that I mistook them for one. In explanation of this charge I beg to state that I have never been to Pehewa myself, and that the inscription I published was communicated to the Asiatic Society by Mr. L. Bowring, C. S., who distinctly stated it to be one record, and added that it was "engraved on a tablet of red sandstone in the temple of a follower of the Gorakhnath persuasion," and not on two tablets at different places. On the face of this, all I could say at the time when I noticed the record was, that "the document was divided into two portions, first of which was in verse and comprised twenty-one lines, and the second was in prose and included eight lines." The facsimile was full of lacunæ and blots, and, as now appears, very imperfect, the prose portion containing only eight out of sixteen and a quarter lines. It is a pity that the General who has lately visited and examined the record has not given more detailed description of the places which the two inscriptions occupy in the temple, nor furnished the Society with fresh facsimiles. The missing eight and a quarter lines of the prose portion is likely to throw much new light on the question at issue.

Literary Intelligence.

General A. Cunningham in a letter to Mr. Grote gives the following results of his late visit to the Punjab.

During my last season's tour through the Punjab I visited all the spots that I could hear of, that gave any promise of yielding remains of interest, and although I have obtained but very few inscriptions, I believe that I have ascertained the position of Taxila in the immediate neighbourhood of Shah-ki-Dheri, beyond all doubt. I believe also that *Sangla-wâla Tiba*, or the hill of Sangâla is the actual site of the *Sangâla* of Alexander. It is a rocky hill rising to 215 feet in height above the plain, and half surrounded by a sheet of water during the rains, but which must have been a permanent lake or swamp 2,000 years ago. The site is covered with very large bricks, and has evidently been deserted for many centuries. The more modern town of *Cheka* as described by Hwen Thsang, may I think be identified with the large ruined town of *Asarur* which is still inhabited.

The point where Alexander crossed the Hydaspes may I believe be looked for a few miles above Jalâlpur. I examined the whole neighbourhood carefully, and I am myself satisfied that the Greek camp must have been near Jalâlpur and the Indian Camp near Mong. The latter place I look upon as the Nikaia of Alexander, and I believe that the name was changed to *Mog* or *Mong* by the Indo-Scythian king *Moas*, or *Moga*, the reputed founder of the place.

The ruined city near Darâpur, on the west bank of the Hydaspes, is now occupied and named *Dilâwar*. It is undoubtedly an ancient site, and may dispute with Jalâlpur the honor of being the site of the famous Bucephala. Jalâlpur itself with its precipitous hill fort of *Gir Jhâk*, is one of the most ancient places in the Punjâb. I think it may be identified with the *Giri-vraja* of the Mahâbhârata.

Mánikyála is attributed to Raja *Manik*, and I believe with good reason, as I found a coin of the satrap *Zeionises* son of *Manigal*, deposited in a Tope, which I excavated, along with a relic box marked with the Arian letter J, the initial of the name of *Jihoniya* or *Zeionises*. The relic-box itself is a perfect model of a Tope, the details of the mouldings, and the surrounding basement, corresponding exactly with those of the Great Mânikyâla Tope. But the summit is crowned by

a series of four umbrellas resting on a square pedestal, and I conclude that the great Tope itself must originally have been finished in the same manner. I am quite satisfied that Mânikyâla is the holy site where Buddha was believed to have made so many sacrifices of his body to a starving tiger. *Huta-murtti*, which means 'sacrifice, or oblation, of body' is found twice in General Court's inscription, and the ground, as described by Hwen Thsang, is still red with blood of the holy Teacher.

Near Shah-ki-Dheri there are the remains of a very extensive city, with stone walls and square towers and streets at right angles, exactly like Taxila as described by Philostratus. There are also scattered around the city the remains of 30 or 40 monasteries and of not less than 50 Topes, of which two are somewhat larger than the Great Mânikyâla Tope. I discovered the base of a pure Greek Ionic column.

The parade ground of the Rawul Pindi cantonment is another ancient site, which has yielded several didrachms of Azas and Hippostratus besides one unique didrachm of Appollodotus.

Another ancient city exists near Hasan Abdâl and close to Baoti Pind. It possesses several Topes all of which had been opened except one, on the top of a hill, in which I obtained a gold coin of about A. D. 400 to 500.

I still adhere to my original position of Aornos at Nogram, as published in 1848. The hollow or valley on the top of the hill agrees exactly with the descriptions of Aornos, and the place is besides attributed to Raja *Vara*.

Profr. Holmboe of Christiania draws attention to further discoveries of the relations which formerly existed between Asia and Scandinavia. A summary of these is given in a letter from him to Babu Rajendralal Mitra, of which the following is a translation.

" In the memoir on the Ortug or Tolâ, I showed that the örtug of the mediæval Scandinavians was identical with the tola of the Indians; which is the more remarkable, as no other European nation has made use of a similar weight. The örtug is $= \frac{1}{6}$ eyris $= \frac{1}{24}$ of the Scandinavian mark, as in Southern India the tolâ $= \frac{1}{6}$ pala $= \frac{1}{24}$ of the sír. Many of the ancient weights in the museums of Scandinavian countries are marked with points or circles equal in number to their

weight in örtugs. I have enumerated these at pages 1—10* and compared them at p. 13. I have shewn the probability that the above mentioned weights were used for the weighment of coins and precious metals, as the tolâ is now used in India. I have shewn that there was a period, when the half-mark or 12 örtugs was regarded as a superior unit, and that the ancient rouble of Russia corresponds in weight to the half-mark of Scandinavia. Finally I have at page 24 given a list of several Swedish, Norwegian, Danish and Indian weights, of ancient dariks and of Sassanian gold coins, which have all nearly the same weight.

A belief exists among the lower classes of Scandinavians, that a light sometimes appears over the sepulchral tumuli of pagan times, indicating that a treasure has been deposited in the tumulus. I have compared with this belief the traditions preserved in the life of the Chinese pilgrim Hwen Thsang, concerning the light which it was believed was seen over several Indian topes, and the efforts made by the Buddhist priests to imbue the people with the belief in a luminous power in the topes and dagobahs in the depths of the rock cut temples.

Previous authors have instituted a comparison between the arms of the gods of thunder, Thor and Indra, but have restricted themselves to a comparison of their form and effects. To these I have added in my memoir, a comparison of their consecrating power.

The fourth pamphlet† contains firstly a description of a little bronze hatchet, lately discovered, and secondly the inventory of a sepulchral tumulus which was opened eleven years ago at a spot, about twenty leagues south of Christiania. Among other things were the skeletons of three horses, one of which bore a saddle, the metallic parts of which were of gilt bronze. With this fact I have compared the customs of the Tartars of the 13th century, spoken of by Rubruquis and Jean du Plan de Carpin who relate that the Tartar chiefs were buried with three horses, one of them saddled."

* Om Ortug eller Tola en Skandinavisk og indisk Vægteenhed.

† Amuletter og om Stormænds Begravelse blandt Skandinaver i Hedenold og blandt Mellemasiens Buddhister.

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PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1864.

The monthly General Meeting of the Asiatic Society of Bengal was held on the 1st instant.

Captain W. N. Lees, Vice-President, in the chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From L. Bowring, Esq., copies of Photographs of some Inscriptions found at Anantpur.

2. From Babu Ramchunder Mitra, copy of a report of a meeting of the Bethune Society held on the 10th September, 1863, and the address to Dr. Duff from the Society, with his reply.

3. From Lieutenant R. C. Beavan, specimens of schorl in quartz and Zoological specimens, namely, two specimens of *Bungarus candidus*, one of *Calotes versicolor*, a skin of *Felis Jacquemontii* and one of a species of *Lepus;* also two Bear's skulls.

4. From Capt. A. K. Comber, Deputy Commissioner of Debrooghur through Major D. Briggs, the skin of an *Arctictis Binturong*, from the Burhampooter river.

5. From Babu Rajendra Mullick, dead specimens of *Dromaius Novæ Hollandiæ* and *Struthio Camelus.*

6. From T. Tomlinson, Esq , on behalf of His Excellency the Governor-General, a dead Tiger from the Barrackpore Park Menagerie.

7. From J. R. Macdonald, Esq., a leaf cloak such as is in common use among the Kôl labourers at Hazaribagh.

8. From Lieutenant-Colonel R. C. Tytler through A. Grote, Esq., a specimen of a new species of *Varanus* from the Andaman Islands.

9. From Mr. C. Swaris, Taxidermist to the Society's Museum, a Bhotanese sword.

10. From Lieutenant-Colonel Thuillier on the part of Mr. Mulheran of the Hyderabad Topographical Survey, a set of 18 Stereoscopic Views of the Caves of Ellora and Ajunta.

11. From A. Carlyle, Esq., copies of his work entitled "the Tale of the Battle of Padmanabham," with a Telugu translation of the same.

12. From the Government of India, through H. R. Carnac, Esq., a fine specimen of a fossil Amphibian from the Pachmari Hills.

Mr. Blanford called the attention of the meeting to this very interesting specimen, which had been expected for some time past, but had only arrived a few days ago. "It was discovered in the early part of last year by Major Gowan, exposed on the face of a block of sandstone lying on the right bank of a small mountain stream about a mile to the westward of Bijori, in the Chindwarra district. The block lay at a spot where the stream is crossed by the cattle road passing from the hill plateau of Pachmari viâ the Rhori pass and Bijori to Mohtoor, and the fossil appears to have been well-known to the natives as the "Machli Katta," (fish bones.) The exact spot has been marked by Lieut. Sim (who subsequently visited the place) on Mr. Medlicott's geological map of Central India, and is on a tract coloured by Mr. Medlicott as the Mahadeva sandstone, a formation of great thickness forming the mass of the Pachmari Hills and resting unconformably upon the coal and plant-bearing groups, part of which are contemporaneous with the lower part of the coal measures of the Ranigunge field. The age of the Mahadeva sandstones is unknown, no fossil remains having hitherto been found in them, but they are overlaid by trap-rocks with intercalated fresh water deposits, the age of which has been lately determined by Mr. W. T. Blanford as pre-nummulitic, while from data afforded by the late Mr. Hislop and others there seems but little doubt that these fresh water deposits are not older than the newest deposits of the Cretaceous period.

Major Gowan's report on the discovery of this fossil was forwarded to the Society by the Government of India, in May 1863, and its importance having been pointed out, the Chief Commissioner of the Central Provinces was requested to have the specimen procured and forwarded to Calcutta. The fossil was shortly afterwards removed by Lieutenant Sim, R. E., carefully packed to prevent injury, and

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forwarded to Nagpore, where it remained in the charge of Mr. H. R. Carnac, awaiting an opportunity of being forwarded to Calcutta, in the charge of some trustworthy person. Meanwhile photographs of the fossils were taken by Mr. Crommelin who had kindly placed the negatives at the disposal of the Society, prints from which were exhibited at the April meeting of the Society.

"From an examination of the specimen as at present exposed, it appears to be allied either to the Archegosaurus or the Labyrinthodon, but the state of the specimen does not at present admit of its precise affinities being accurately determined. It exhibits a nearly perfect cast of the skull, the roof bones being wanting, and probably having remained attached to the matrix when the fossil was removed. The form of the skull and the position of the orbits are, however, distinctly shown; the mandible is partly preserved, but the teeth are all broken through longitudinally, and so worn away that little more than their general form can be traced. The palatal bones and all the floor of the skull are probably preserved, but hidden by the hard sandstone which fills the cavity of the lower jaw. The base of the skull is also im bedded, and the existence of condyles, the presence of which would determine its Labyrinthodont affinities, cannot be ascertained.

"When found, the position of the specimen was reversed, the ventral face being uppermost, and a portion of the dorsal vertebræ and ribs, or rather their impressions, being exposed on the surface of the stone.

"The ribs are short, very slightly curved and flattened at their distal extremities; their attachments are not seen. There is some question as to the centra of the vertebræ; if, as Dr. Partridge thinks, the continuous series of hour-glass-shaped sandstone bodies visible represent the centra, the notochord must have been persistent, and this character would place the fossil nearer to Archegosaurus than Labyrinthodon. Some squamose plates partially exposed on the ventral surface of the throat tend to bear out the idea that the present species is Ganocephaloid, but further investigation with hammer and chisel is required to settle the point.

"To whichever group this fossil may eventually prove to belong, its geological indications are much the same. The Ganocephala have indeed hitherto been met with only in rocks of the carboniferous age, whereas Labyrinthodonts are known to range from Carboniferous to Upper Trias

or possibly the Lias, but no great stress could be laid on such a degree of difference in range, the remains of such animals being everywhere rare. Both groups are characteristic of the great transition fauna intervening between that of the Silurian and Devonian systems and that of Mesozoic times. So far as one can predicate the geological age of such remains from our present knowledge, we may refer the fossil either to the Carboniferous, Permian or Triassic period, with a preponderant probability in favour of the former.

"Until the geology of that part of the Mahadeva hills in which the fossil occurs has been re-examined by some one acquainted with the ocal peculiarities of the rocks, it will be premature to offer any opinion as to the age of the Mahadeva sandstones. The belief I have entertained for some years past is, that they are cretaceous, a belief partly founded on Mr. Theobald's inference of their relation to the Baug beds, partly on their geological relations to the trap rocks already mentioned, and which rest conformably upon them; but if the specimen on the table be really from the Mahadevas, this formation must go back to a very much more ancient period. It should be mentioned as bearing on this point, that the mineral character of the matrix of the fossil is a hard gray micaceous sandstone such as is very characteristic of the coal-bearing rocks of India, but is very different from the typical sandstones of the Mahadevas, which are soft coarse grits with little specks of Kaolin, and frequently ferruginous.

"Labyrinthodont remains have twice before been discovered in India, viz. at Mangali about 120 miles south of Nagpore and in the formation which overlies the upper coal-bearing rocks of the Ranigunge coal field, and which has been termed by Mr. W. T. Blanford, the Lower Panchit Group."

In conclusion Mr. Blanford expressed the indebtedness of the Society to those gentlemen to whose exertions the Society owes this highly interesting fossil, and proposed that the special thanks of the Society be voted to Major Gowan the original discoverer, to Mr. H. Rivett Carnac, who had throughout taken an active part in procuring the fossil, and in getting it photographed, and finally in transmitting it to Calcutta; to Lieutenant Sim, R. E., who had gone to its site, expressly to obtain it, and to Mr. Crommelin, who had photographed it and presented the negative plates and several prints thereof to the Society.

This proposition was unanimously acceded to by the meeting.

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A letter from L. Bowring, Esq., relating to the copper Sáshana from Mysore was read.

The following gentlemen duly proposed at the last meeting were balloted for and elected ordinary members:

Brigadier General H. G. D. Showers; R. E. Goolden, Esq.; J. O'B. Saunders, Esq.; Moulvi Moula Bukhsh Khan Bahadoor and Babu Jadu Nath Mookerjee.

The following gentlemen were named for ballot as ordinary members at the next meeting:

Lieutenant H. Trotter, R. E., G. T. S., proposed by Captain Montgomerie, R. E., seconded by Lieutenant-Colonel Thuillier.

J. C. Whishaw, Esq., Civil Surgeon, proposed by Captain W. N. Lees, seconded by Mr. H. F. Blanford.

Babu Debendra Mullick, proposed by Mr. Grote, seconded by Mr. H. F. Blanford.

With reference to the proposal of Dr. Jerdon that Mr. Blyth be elected a corresponding member of the Society, the Council reported that in their opinion the proposed election would confer no additional distinction on Mr. Blyth, that gentleman being already an associate member of the Society.

The Chairman reported to the meeting that the announcement made at the last meeting that Mr. Beaufort had withdrawn from the Society was erroneous; Mr. Beaufort's name had therefore been restored to the list of members.

The Secretary read the following letter from Colonel Thuillier:

To H. F. Blanford, Esq.

Dear Sir, *6th May*, 1864.

"Having gone out of the Council of the Asiatic on rotation in virtue of a principle introduced for the benefit of the Society, I do not consider myself eligible for re-election at so early a period. I regret therefore that it is not in my power to respond to the honor which the Council has been so good as to confer on me, and I must beg of them to excuse me."

Your's faithfully,

(Sd.) H. L. Thuillier.

The report of the Council appointing Mr. H. Scott Smith as a member of their body in the place of Mr. H. Leonard was confirmed.

The Council reported that they had elected Mr. H. B. Medlicott and Mr. Oldham to the Council in the place of Colonel Dickens, who had resigned, and Colonel Thuillier who had been elected, but had declined to accept the office at present.

They further reported that the following gentlemen had been elected to the Committees:

Meteorological Committee.—Colonel H. L. Thuillier and T. Martin, Esq.

Natural History Committee.—Lieutenant R. C. Beavan.

Finance Committee.—H. D. Sandeman, Esq.

They also reported that they had appointed Mr. A. Carlyle as Officiating Curator of the Society on a salary of Rs. 250 per mensem, on the express understanding that the appointment should be a temporary one.

Communications were received—

1. From E. Thomas, Esq., a paper on Ancient Indian Weights.

2. From W. Theobald, Esq., Jr., a paper entitled "Observations on Certain Strictures of Mr. H. F. Blanford on my paper on the distribution of Indian Gasteropoda in Journal, No. 289, Page 69."

3. From Dr. A. Bastian, a copy of a translation of the oldest stone inscription found in Siam.

4. From Baboo Gopinath Sen, an abstract of the Hourly Meteorological Observations taken at the Surveyor General's Office for the month of March last.

The papers of Dr. Bastian and Mr. Theobald were read.*

Mr. Blanford in reply to Mr. Theobald's remarks, admitted that Mr. Theobald had very properly corrected him on the question of authority, and that he must therefore modify his statement somewhat carelessly made on a former occasion that no Naturalist of any eminence held the view that species were of sporadic origin. He did not think, however, that this correction made any material difference as to the real point at issue, viz. whether there were any good grounds for inferring that one and the same species had commenced its existence at more than one centre. Mr. Blanford had not seen the work quoted by Mr. Theobald, but if Mr. Theobald's quotations fairly represented the arguments for sporadic origin, he thought they were quite inconclusive, and the facts adduced in support offered nothing new or

* These will appear in due course in the body of the Journal.

not contemplated by Mr. Blanford in his former objections to Mr. Theobald's deduction. The argument was that in two distinct drainage basins, the majority of the species were distinct, whereas one, the pickerel, was common to both, and the inference drawn was that therefore the pickerel had commenced its existence as a species in the two areas independently. But similar phenomena are of common occurrence, though exceptional, as compared with the general facts of distribution—and it did not seem that they justified the conclusion drawn by M. Agassiz. It would be impossible to offer more than suggestion towards explaining the particular case quoted, in a manner reconcilable with the view that the species of pickerel had originally proceeded from a common centre, inasmuch as many very important data bearing on the case were not at hand. He would therefore make some general suggestions, and illustrate them by a parallel case, with which he was more acquainted, being in fact that which had given rise to this discussion.

When it is said that species are distinct, nothing more is as a rule really implied than that two series of forms shew such a degree of difference that it is convenient to distinguish them by different names. When the differences are small it is usual to call them varieties, but at the present day the distinction between species and varieties can be merely regarded as one of degree, and whether a new set of forms is treated as a species or variety, depends partly on the habit of the describer, partly on the amount of information he possesses as to the existence of intermediate forms.

The definition of Cuvier, which had long been accepted by naturalists, that "A species is a collection of individuals descended from one another, or from common parents, and from those which resemble them as much as they resemble themselves," is clearly of no use when the question under discussion is whether two given distinct sets of forms are, or may be, descended from a common stock. Actual degrees of resemblance are in most cases the only criteria at the command of a naturalist, and in a few cases the power of interbreeding and producing fertile progeny. But the inferences drawn from the latter are by no means always in accordance with those drawn from the former. The recent investigations of M. Ch. Naudin on the hybridity of plants proved that in certain cases, species which in external and anatomical characters were only distinguishable by great practice,

and which indeed "most Botanists fail to distinguish" resist all attempts to cross them, while others very different from each other, and universally recognised as species easily give origin to fertile hybrids. Man is generally regarded as a single species, but M. Paul Broca brings forward a multitude of facts to shew that between the different races of mankind, the degrees to which crossing is possible vary greatly, and that the Australian and European do not produce a permanent mixed breed. The same appears to be the case in Ceylon, where the Portuguese and Dutch have left scarcely any descendants of mixed blood, and where there is good reason, on excellent authority, to infer that were the English now to leave the Island, the same extinction of the mixed race would shortly supervene. Much more might be said on this point, and to show that hybridity is not a simple phenomenon, but exists in all degrees and is affected by slight changes of condition.

If, then, interbreeding be taken as the criterion of species, resemblance of apparent character which is in most cases the only point ascertained, is clearly not reliable. The Chinese and Indian pheasants interbreed freely although very different in plumage, &c., and the mere fact of two forms differing to such an extent as to be entitled to receive different names is no argument that their origin is distinct even according to our present knowledge, and on the unproved and apparently improbable assumption that forms of common descent in all cases interbreed freely.

In the case adduced by M. Agassiz, we do not know how far the species termed by him distinct are really so on other than grounds of external difference, and the case therefore cannot be argued. It may be that at a former geological period communication existed between the two basins, and that there was a dispersion of species, that since the separation certain of these have so varied in one or both areas as now to be regarded as distinct, while the pickerel has not so varied. Again, two rivers flowing respectively north and south would afford conditions so different that certain forms formerly common might become extinct in one case or the other, whether by change of climate, by collision with new species of other forms of life, in short by a change in any one of those numerous conditions which affect existence and the destruction of a balance of favourable conditions previously existing. All these are possibilities which, although they can be merely

suggested, still require investigation before the inference drawn by M. Agassiz can be admitted.—To take a case better capable of argument; that of the Hill Mollusca of Southern India. It is an actual fact that while certain of the species, as *Helix Castra* are common to two or more isolated groups, others, such as the *Diplommatinas* differ on two hill groups, but are more closely allied to each other than to their congeners on the Himalaya or elsewhere. This latter may be regarded as a case in which specific variation has supervened since that communication of conditions existed between the hill groups, which has been inferred on geological grounds. The *Streptaxes* differ less than the *Diplommatinas*, and it is questionable whether on the score of difference of external characters alone they should be treated as species or varieties, so that here we have gradations of difference up to actual identity. This is certainly in accordance with the view that variation has supervened since separation, and is not accounted for rationally by the assumption that each hill group is an original centre of specific distribution.

Mr. Theobald has much combated and ridiculed the idea of accidental distribution by floating timber, &c., but now apparently admits it as an occasional though rare phenomenon. It was never regarded by Mr. Blanford as otherwise than exceptional, but there may be other modes of distribution by transport, not yet known or fully appreciated. In a paper lately transmitted to the Linnean Society, Mr. Blanford had remarked upon certain facts of distribution of *Melaniæ* and *Paludomi* which seemed to support Mr. Darwin's view that birds are active unconscious agents of transport. The *Melaniæ* and *Paludomi* of marshes, tanks, estuaries, &c., which are much frequented by water fowl, are of extremely wide distribution. Those of hill streams, which are not frequented by water fowl are of very restricted range, and even in small areas, as in the hill region of Ceylon, two adjacent streams not communicating were tenanted by forms so different that they had in a great number of cases been described as distinct, although as Mr. Blanford had shown by the comparison of large numbers taken from a great variety of localities, they were almost unquestionably mere varieties, that is, that the most diverse forms were connected by intermediate gradations. How communication originally took place can only be surmised, but the comparative absence or rarity of communication had here admitted of great local

variation, which was treated as specific until a thorough investigation with ample materials had been undertaken.

The theory of common descent of animals and of plants must require centuries of investigation to establish it, but reviewing the whole history of Biology hitherto, Mr. Blanford could not but arrive at a conclusion similar to that of the veteran Schleiden. "Wonderfully strange and even absurd as the thought may appear to-day to many, that all organisms on the earth, vegetable as well as animal, extinct as well as living forms, are connected with one another as a single great family by natural descent, a man need not be a great prophet to tell, that before long, this doctrine will be the currently accepted and unquestioned property of every man of Science. Though at present many intelligent and many unintelligent voices are making themselves heard against Darwin, he has already a large number of powerful allies on his side, and the result cannot be doubtful."

The chairman then read an extract from a letter from General Cunningham to the address of Mr. Grote on the subject of the Pehewa inscription, which extract appears as a postscript to General Cunningham's paper on that subject in the present number of the Journal, p. 229.

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Meteorological Observations taken at Gangaroowa near Kandy, Ceylon, in the month of August, 1863.

Alt. 1560 ft.; E. Long. 80° 37′, N. Lat. 7° 17′.

All the Instruments (excepting the Max. for the Air, and Min. for the Grass) have been compared with standard.

The tension of aqueous vapour, from which are deduced the pressure of dry air, the dew point and humidity, has been found by the formula $f = f' - \frac{d}{88} \times \frac{h}{30}$ given in Mr. Drew's "Practical Meteorology," (Ed. 1855) and the tables therein given.

The dew is the weight in grains deposited on a square foot of ordinary woollen cloth exposed on a board from 6 P. M. to 6 A. M. or for as many hours as there is no rain.

The rain gauge is 4½ feet above the ground.

The ozone cage is hung about 25 feet above the ground.

The direction of the wind given is that of the lowest current by the vane, and of the currents above this by the direction in which the Nimbi and Cumulo-Strati clouds are moving.

In this column a "calm" signifies that the clouds are apparently motionless: "variable," that the clouds apparently in the same or nearly the same stratum move in no fixed direction, but their parts move as if in vortices, or different masses of them move up from different quarters as if into a vast vortex, this being nearly always the case before thunder storms.

Entries, such as W S W and N N W or $\frac{\text{W S W}}{\text{N N W and calm,}}$ signify that the clouds are evidently in strata of different altitudes, that those in the lowest stratum move from W. S. W. those in the next higher from N. N. W.; those in the next are apparently becalmed, and so on.

The velocity and distance in 24 hours are given by Robinson's Anemometer.

In the column for Lightning and Thunder

L = "Lightning" when the flash is near enough to be visible.

L R = "Lightning Reflection" when the flash is so distant that only its reflection on the clouds or in the air is visible.

"Morn," is 6 A. M., "Even," 6 P. M. and "Night," 12 P. M. and "fore" and "after" are prefixed to these, as ordinarily to "Noon," to denote the 3 previous and 3 following hours.

R. H. Barnes.

Gangaroowa near Kandy, Ceylon.

August, 1863.	Barometer reduced to 32°.			Pressure of Dry Air.			Thermometer.			Dew Point.		
	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0
1	28.363	28.270	28.376	27.660	27.535	27.714	74.5	77.5	69.5	69.0	70.3	67.1
2	.388	.293	.368	.691	.533	.689	74.7	75.8	71.0	68.7	71.4	67.9
3	.337	.265	.339	.597	.530	.635	75.0	74.5	70.3	70.6	70.3	69.0
4	.341	.250	.323	.642	.537	.691	72.6	75.2	71.4	68.8	69.4	65.7
5	.333	.245	.338	.632	.498	.665	75.0	77.4	72.5	68.9	70.8	67.6
6	.319	.254	.313	.584	.499	.580	74.8	76.0	71.7	70.3	71.2	70.3
7	.310	.230	.335	.564	.446	.638	72.8	75.6	71.9	70.8	72.3	68.7
8	.329	.248	.350	.564	.458	.679	74.0	76.8	71.8	71.6	72.6	67.5
9	.341	.251	.346	.591	.472	.692	73.1	75.1	71.5	71.0	72.1	66.7
10	.335	.247	.326	.610	.508	.714	73.1	74.5	70.2	69.9	70.5	64.8
11	.332	.227	.302	.662	.490	.651	72.5	74.3	71.4	67.5	70.4	66.6
12	.297	.205	.298	.592	.491	.606	73.4	75.0	70.1	69.0	69.5	68.5
13	.301	.228	.340	.575	.467	.671	73.0	73.1	71.0	70.0	71.4	67.5
14	.341	.245	.328	.601	.506	.666	73.0	74.1	72.0	70.6	70.5	67.1
15	.317	.219	.311	.612	.450	.639	73.0	75.0	72.0	69.1	71.7	67.6
16	.313	.226	.307	.560	.471	.591	72.8	73.0	71.0	71.1	71.1	69.5
17	.308	.230	.349	.562	.457	.659	72.1	74.0	70.9	70.8	71.9	68.4
18	.305	.230	.328	.586	.476	.647	73.0	75.1	70.2	69.7	71.1	68.0
19	.325	.213	.324	.599	.394	.629	74.0	78.7	72.0	70.0	73.7	68.6
20	.319	.210	.313	.628	.389	.545	75.0	78.8	73.1	68.4	73.8	71.7
21	.337	.209	.318	.617	.395	.579	74.9	79.8	72.1	69.7	73.5	70.5
22	.305	.203	.304	.599	.397	.540	75.2	79.5	73.5	69.1	73.2	71.5
23	.333	.218	.312	.585	.425	.569	76.6	79.3	73.1	70.9	72.7	70.7
24	.319	.230	.340	.606	.416	.585	76.6	79.8	74.0	69.4	73.5	71.1
25	.318	.233	.314	.603	.421	.520	76.7	79.3	75.0	69.5	73.4	72.7
26	.306	.195	.291	.584	.348	.591	77.0	81.8	71.3	69.8	74.8	68.8
27	.317	.215	.308	.580	.451	.605	77.0	78.2	71.6	70.4	71.5	69.0
28	.313	.198	.295	.581	.434	.633	76.4	76.1	72.0	70.2	71.5	67.1
29	.273	.183	.277	.537	.452	.600	76.1	76.6	70.0	70.4	70.2	67.8
30	.239	.121	.245	.537	.314	.560	75.6	80.9	69.8	68.9	73.2	68.2
31	.253	.158	.271	.542	.374	.601	75.4	77.0	71.9	69.3	72.3	67.5
	28.318	28.224	28.319	27.596	27.453	27.625	74.5	76.7	71.6	69.8	71.8	68.5

Gangaboowa near Kandy, Ceylon.

Humidity.										Rain.		
A. M. 9.30	P. M. 3.30	P. M. 10.0	In Sun's Rays at 12 o'clock.	Minimum on the Grass.	Maximum in Air.	Minimum in Air.	Difference.	Mean.	Dew.	A. M. 9.30	P. M. 10.0	Total.
837	794	925	0	61.0	79.4	65.5	13.9	72.4	203	0.000	0.000	0.000
824	868	906	122.7	65.2	77.0	68.3	8.7	72.7	47	0.000	0.063	0.063
867	875	958	101.0	66.1	76.1	70.0	6.1	73.0	0	0.008	0.190	0.198
884	830	830	112.0	67.0	75.8	68.8	7.0	72.3	0	0.298	0.005	0.303
821	810	854	127.0	64.6	78.3	68.7	9.6	73.5	21	0.000	0.000	0.000
867	856	954	107.0	67.1	77.4	69.9	7.5	73.7	0	0.007	0.060	0.067
937	901	901	89.8	0	75.8	70.2	5.6	73.0	0	0.177	0.060	0.237
925	873	870	96.0	67.5	76.9	69.7	7.2	73.3	0	0.124	0.040	0.164
933	909	856	88.5	65.9	75.8	69.6	6.2	72.7	0	0.088	0.494	0.582
902	879	837	99.1	67.5	75.1	69.4	5.7	72.2	0	0.017	0.014	0.031
850	883	856	96.3	65.2	76.2	68.8	7.4	72.5	0	0.010	0.058	0.068
868	838	949	118.6	65.6	76.7	68.5	8.2	72.6	0	0.079	0.126	0.205
907	947	891	91.5	65.3	75.6	67.6	8.0	71.6	0	0.419	0.390	0.809
924	891	853	108.2	66.3	75.0	68.8	6.2	71.9	0	0.120	0.141	0.261
881	900	866	105.0	67.4	75.9	69.5	6.4	72.7	136	0.000	0.009	0.009
946	942	954	86.9	67.5	74.6	69.3	5.3	72.0	0	0.145	0.876	1.021
959	934	922	93.5	68.4	74.5	69.3	5.2	71.9	0	1.178	0.220	1.398
898	879	931	118.9	64.2	75.8	68.2	7.6	72.0	54	0.000	0.000	0.000
879	852	896	134.0	66.6	78.9	69.0	9.9	73.9	145	0.000	0.000	0.000
809	852	955	134.0	61.8	79.9	66.1	13.8	73.0	350	0.000	0.000	0.000
846	819	950	134.2	64.1	80.3	68.2	12.1	74.3	0	0.007	0.000	0.007
821	818	938	135.8	62.5	81.7	66.8	14.9	74.2	316	0.000	0.000	0.000
832	810	924	134.0	63.9	81.6	68.7	12.9	75.2	271	0.000	0.000	0.000
793	819	912	134.3	63.1	81.1	67.5	13.6	74.3	201	0.000	0.000	0.000
793	829	930	134.5	63.3	82.0	67.8	14.2	74.9	0	0.011	0.000	0.011
794	799	922	138.3	65.4	81.8	68.9	12.9	75.3	0	0.004	0.017	0.021
810	808	918	133.8	63.2	81.8	67.4	14.4	74.6	337	0.000	0.000	0.000
820	864	853	135.1	66.1	81.3	70.2	11.1	75.8	0	0.009	0.034	0.043
831	813	931	0	65.8	78.6	69.3	9.3	73.9	0	0.008	0.009	0.017
806	778	949	140.8	63.0	81.1	67.2	13.9	74.2	242	0.000	0.065	0.065
822	862	866	115.0	0	77.4	68.6	8.8	73.0	0	0.003	0.000	0.003
861	856	905	116.1	65.2	78.0	68.6	9.5	73.3	2323	2.712	2.871	5.583

Gangaroowa near Kandy, Ceylon.

	A. M. 9.30							P. M. 3.30						
August, 1863.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.
1	2.0	0	4.0	0	4.0	0	10.0	1.5	0	0.2	0	7.8	0	9.5
2	0	0	0	0	9.7	0	9.7	0	0	0	0	0	9.5	9.5
3	1.0	0	0.4	0	0	8.5	9.9	0	0	0	0	0	10.0	10.0
4	0	0	8.3	0	0	1.7	10.0	0.3	0	4.4	0	5.3	0	10.0
5	8.0	0	0	0	1.0	0	9.0	1.0	0	0	0	7.0	0	8.0
6	0	0	0.3	0	9 6	0	9.9	0.1	0	0.3	0	8.6	0	9.0
7	0	0	0	0	0	10.0	10.0	0	7.2	8	0	2.5	0	9.7
8	0.3	0	0	0	0	9.7	10.0	8	0	0	0	0	9.3	9.3
9	0.1	0	0	0	0	9.9	10.0	0	0	3.0	0	0	6.0	9.0
10	0.4	0	0.2	0	0	9.3	9.9	1.5	0	0.4	0	0	7.5	9.4
11	0	0	0.5	0	0.5	9.0	10.0	1.0	0	0	0	0	8.5	9.5
12	0.2	0	0	0	0	9.4	9.6	1.5	0	0	0	0	8.5	10.0
13	0.1	0	0.3	0	0	9.6	10.0	0	0	0	0	0	10.0	10.0
14	0.3	0	1.2	0	0	8.5	10.0	4.0	0	0.5	0	0	5.5	10.0
15	0	0	0	0	0	10.0	10.0	2.5	0	0	0	0	7.5	10.0
16	0.1	0	0.2	0	0	9.7	10.0	0	0	0.2	0	0	9.8	10.0
17	0	0	0	0	0	10.0	10.0	0.3	0	0	0	0	9.3	9.6
18	0	0	0.5	0	0	9.5	10.0	1.5	0	6.4	0	2.0	0	9.9
19	0	0	4.7	0	4.7	0	9.4	0	5.0	0.4	0	2.6	0	8.0
20	0.5	0	0	0	8	0	0.5	0	0	0	0	0	0	0
21	9.0	0	0.8	0	0.2	0	10.0	8.8	0	0	0	1.0	0	9.8
22	10.0	0	0	0	0	0	10.0	0	9.3	0	0.4	0.3	0	10.0
23	0.4	0	0	0	4.0	0	4.4	0	6.9	0	0	3.0	0	9.9
24	10.0	0	0	0	8	0	10.0	0	3.5	0.5	0	6.0	0	10.0
25	10.0	0	0	0	8	0	10.0	0.4	7.8	0	0	1.5	0	9.7
26	10.0	0	0	0	8	0	10.0	0	6.0	0	0	0	4.0	10.0
27	0 5	0	0.6	0	3.3	0	4.4	0.6	6.9	0	0	0	2.5	10.0
28	0.4	0	0	0	9.3	0	9.7	0	7.9	0.3	0	0	1.8	10.0
29	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0.2	0	1.5	0	0	0	1.7	0	6.2	0	0.1	0	3.5	9.8
31	0	5.7	2.0	0	2.0	0	9.7	0	0	9.5	0	0.5	0	10.0
	2.1	0.2	0.8	0.0	1.6	4.2	8.9	0.8	2.3	0.9	0.0	1.7	3.9	9.6

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Gangaroowa near Kandy, Ceylon.

P. M. 10.0							Ozone.		9.30 A.M. Direction of wind.		Velocity in feet per Second.
Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus	Total.	6 A. M.	6 P. M.	Vane.	Lower Clouds.	
9.9	0	0	0	0.1	0	10 0	1	0	S W	S W	7.30
0	0	0.1	0	0	9.9	10.0	2	2	W S W	W S W	4.84
0	0	0	0	0	10.0	10.0	2	3	W S W	W S W	7.04
7.0	0	3.0	0	0	0	10.0	1	2	W S W	W S W	5.28
0	0	0	0	9.0	0	9.0	7	1	W S W	S W	12.58
0	0	0	0	0	10.0	10.0	1	2	W S W	W S W	6.16
0	0	0	0	0	10.0	10.0	2	0	S W	W S W	3.87
0	0	0	0	0	9.8	9.8	3	2	W by S	W S W	5.28
4.0	0	0	0	6.0	0	10.0	3	2	W N W	W S W	4.84
0	0	10.0	0	0	0	10.0	2	1	W by S	W S W	10 56
0	0	0	0	0	10.0	10.0	0	1	W S W	W S W	6.69
0	0	0	0	0	10.0	10.0	2	0	W S W	W by S	9.68
0	0	0	0	0	10.0	10.0	3	3	W by S	W by S	8.27
0	0	0	0	0	10.0	10.0	1	1	S W	W by S	7.04
0	0	0	0	0	10.0	10.0	1	2	W by S	W by S	5.90
0	0	0	0	0	10.0	10.0	2	2	W S W	W by S	5.28
0	0	0	0	9.6	0	9.6	3	2	S W by W	W S W	5.72
8.0	0	0	0	2.0	0	10.0	1	1	W S W	W S W	6 78
0	0	0	0	9.0	0	9.0	0	0	W S W	W S W	4.58
0	0	0	0	10.0	0	10.0	1	0	S	None	0.62
8.0	0	0	0	0	0	8.0	2	1	S S W	W S W	4.05
0	8.7	0.3	0	1.0	0	10.0	1	1	W	None	3.52
0	9.2	0	0	0	0	9.2	2	1	W by N	S W	7.83
0	0.2	0	0	0	9.8	10.0	1	1	W	None	2 90
0	0	0	0	10.0	0	10.0	1	0	W by S	None	2.02
0	0	10.0	0	0	0	10.0	1	0	S	None	4.40
3.5	0	3.5	0	S	0	7.0	0	0	S W by W	S S W	5 54
3.0	0	0	0	6.7	0	9.7	2	0	W	W S W	4.58
5.0	0	0	0	5.0	0	10.0	1	1	.....	.....	...
0	0	0	0	0	10.0	10.0	1	1	W	None	1.85
0	0	10.0	0	S	0	10.0	1	0	S	S S W	4.05
1.6	0.6	1.2	0.0	2.1	4.2	9.7	1.6	1.1	.....	.....	5.64

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Gangaroowa near Kandy, Ceylon.

August, 1863.	3.30 P. M. Direction of wind.		Velocity in feet per Second.	10.0 P. M. Direction of wind.		Velocity in feet per Second.
	Vane.	Lower Clouds.		Vane.	Lower Clouds.	
1	W	W S W	6.95	N W by N	S W	3.78
2	S W	W S W	6.34	W	W S W	4.40
3	W	W by S	5.98	W S W	W S W	1.76
4	W S W	W S W	5.63	W N W	None	1.94
5	W	W S W	9.33	W by S	Variable	2.46
6	W	W S W	4.22	S W	?	2.02
7	W S W	S W by W	6.16	W S W	W S W (?)	6.60
8	W by N	W S W	5.46	S W	W S W	0.18
9	W by N	W S W	11.26	W by S	W S W	6.25
10	W	W S W	9.33	W	None	3.34
11	W	W S W	8.98	W by N	W by S	6.16
12	W	W by S	9.77	W by S	W by S	3.34
13	S W by W	W S W	2.11	W S W	W by S	5.28
14	W by N	W	5.81	W S W	W (?)	4.84
15	W	W by S	4.31	W S W	?	0.97
16	W	W S W	3.17	W by S	?	0.79
17	S W	W by S	7.13	W S W	W S W	2.99
18	W by S	S W	8.18	W N W	S S W	0.70
19	W N W	W S W & Calm	5.54	W	?	0.18
20	W	Calm.	1.23	N W by N	Calm ?	2.64
21	W by N	W S W & Calm	5.11	W	None	0.09
22	W by N	W S W & Calm	4.66	W N W	?	2.11
23	W N W	Calm	3.96	N W by W	None	0.26
24	W	N E	5.02	S E	Calm	0.00
25	W	W N W & Calm	0.35	W	W	1.06
26	W N W	Calm	2.29	Calm	None	0.00
27	W by N	S S W	5.54	N W	None	2.82
28	W S W	S W	6.42	W by N	S W	2.29
29	.....	.....	...	W N W	W S W	0.09
30	W by N	Calm	3.96	N	Calm	1.67
31	N W by W	S S W (?)	5.37	W by N	None	0.00
	.....	.....	5.65	.....	.....	2.29

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GANGAROOWA NEAR KANDY, CEYLON.

Distance in Miles in 24 Hours.	Lightning and Thunder.
56.56	
67.01	
82.71	
102.35	
78.52	
71.28	
62 50	L. R. to N. E. in after even.
83.45	
85 75	
108.61	
113.03	
128.42	
117.36	
106.74	
83.81	
34.64	
67.67	
77.36	
50.04	L. R. to N. E. in after even.
33.93	Th. in fore even. L. R. to N. E. in after even.
41.97	Th. in fore even. L. R. to N. E. & S. E. in after even.
41.92	Th. in afternoon. L. & L. R. & Th. to N—N. E. & L. R. to E. & S. E.
52.74	L. R. to N. N. E—N. E. & E. & S. E. in after even. [in after even.
48.38	Th. in afternoon. L. R. to N. by E. & L. & Th. to S. E. in after even.
32.91	Th. in afternoon.
33.03	Th. in afternoon.
51.90	Th. in afternoon.
49.10	Th. in afternoon.
52.55	L. & Th. a few Miles distant in after even. [ter even.
40.50	Th. in afternoon, fore and after even; L. & L. R. & Th. to N. E. in af-
50.23	
67.97	

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GANGAROOWA NEAR KANDY, CEYLON.

August, 1863.	GENERAL REMARKS.
1	Cloudy, but fine, fresh and dry.
2	Fine till 11 o'clock, Showery after.
3	Mild to warm and damp, showery all day.
4	Rain during the night; cloudy but pleasant day.
5	Fine, dry and pleasant day.
6	Cloudy, mild to warm, pleasant, light showers.
7	Damp and showery till 3 P. M., then fine and pleasant.
8	Damp and showery till 3 P. M., then fine and pleasant.
9	Showers till 3.30 P. M., cloudy and damp all day.
10	Mild to warm and pleasant, cloudy, a little rain.
11	Mild to warm and pleasant, cloudy, light showers.
12	Mild to warm and pleasant, cloudy, light showers.
13	Damp, rather heavy showers all day.
14	Mild to warm and pleasant; cloudy, showers.
15	Mild to warm and pleasant; cloudy, a little rain.
16	Damp, showers throughout the day.
17	Very damp; heavy rain in morn, showers after.
18	Cloudy, fine pleasant day.
19	Fine, clear morn and forenoon, cloudy, hot and sultry after.
20	Fine, clear morn and forenoon, cloudy, hot and sultry after.
21	Fine, clear morn and forenoon, cloudy, hot and sultry after.
22	Fine, clear morn and forenoon, cloudy, hot and sultry after.
23	Fine, clear morn and forenoon, cloudy, hot and sultry after.
24	Cloudy all day; fresh morn, hot and sultry at noon and after.
25	Cloudy, fresh morn and forenoon; hot and very sultry after.
26	Cloudy, fresh morn, very hot and sultry after.
27	Cloudy, fresh morn, very hot and sultry after. [and pleasant.
28	Cloudy, fresh morn, hot forenoon, a little rain in afternoon and then mild
29	Rain at night and in even, cloudy, fine day.
30	Fine fresh morn, hot noon & very sultry after heavy clouds & rain in even.
31	Cloudy but fine pleasant day.
	Solar Halo on 1st, 12th, 22nd, Lunar Halo on 1st, 29th.

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JOURNAL

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On the application of the Characters of the Roman Alphabet to Oriental Languages.—*By Capt.* W. NASSAU LEES.

I cannot call the paper I am about to read to you this Evening a "scientific paper," and perhaps I owe this meeting some apology for reading it within these walls: but the name of our illustrious founder is so often associated with the question which I have discussed, and the subject is so intimately connected with the labours of such distinguished members of our Society as James Prinsep, H H. Wilson, E. Thomas, E. C. Bayley, General Cunningham, Babu Rajendra Lall Mitra &c., that I have thought it would not prove wholly uninteresting to you.

The substitution of the Roman for Oriental alphabets is a question that about some thirty years ago occupied the attention of educationists and others in India. It did not make much progress at first, nor find favour outside missionary circles; and for a long time the subject would seem to have slumbered. Within the past few years, however, it has occupied the attention of certain distinguished members of the German school of Orientalists; Sanskrit books have been printed in it; and Dr. Sprenger, an eminent Arabic scholar, well known in India, has written two able and interesting articles in the *Augsburgh Gazette*, which within the last few weeks have been republished in Calcutta, advocating the change, as one necessary to enable the languages of the East to become the vehicles of conveying western ideas to the people of this country. As long as the discus-

sion regarding the introduction of the Roman alphabet, into India, was confined to missionaries, it was not necessary for us to meddle with it; but when it is taken up by such high authorities, as those who are now interested in it—and has been removed, as it were, from the arena of controversy, considering the important bearing it has on the intellectual progress of an empire containing very many millions of souls, it is one that ought not to be treated lightly; but in a sober and philosophic spirit, such indeed as that adopted by my esteemed friend Dr. Sprenger, in his paper alluded to.

In considering every question, however, in which a variety of interests are involved, or which is peculiarly liable to be acted upon by circumstances outside and foreign to the end ultimately to be arrived at, it ought to be a *sine qua non*, that prior to its discussion, that end should be so fixed and determined, that we shall know exactly what we desire to accomplish, and that during its discussion the arguments used shall tend solely to that finite point where *proof* of the proposition or theorem proposed for demonstration can be found.

Now in the discussions on the subject of romanizing the Oriental alphabets carried on many years ago, the parties engaged in them had far too much of the character of partizans to arrive at any sound conclusion. Dr. Sprenger has fallen into error in supposing that Dr. Tytler, the two Prinseps, and Sir Charles Trevelyan, were in accord in these discussions. They were wholly opposed; but their opposition may be traced, I think in a great measure to partizanship. In those days there were two schools of educationists in India—the orientalists and the anglicists. The former, in these discussions, was represented by James and Thoby Prinsep and Dr. Tytler. The latter by Messrs. Macaulay and Trevelyan, Dr. Duff and other missionaries. The question they fought, though nominally the battle of the alphabets, was quite as much a battle of languages, and this question has perhaps also been too much mixed up with the real one by Dr. Sprenger.

Missionaries again,—and I do not suppose they make any secret of it,—advocate the adoption of the Roman alphabet, rather because they believe it will aid them in the work of conversion, than from a conviction of its greater suitableness for the purposes of writing oriental languages, and from that source, therefore, we can hardly look for wholly unbiassed conclusions.

A third class would adopt the Roman in preference to the Oriental

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characters, because books printed in them could be sold cheaper, and to this school belong, I believe, all German orientalists who are in favour of the change, except perhaps Dr. Sprenger himself. The Germans, it is an admitted fact, are the best Oriental scholars in the world. Indeed, it is almost impossible to find a Sanscrit scholar now, who is not a German; and it is a grave disgrace to England and to India that such should be the case. They buy a very great number of Oriental books, and they would naturally like that the price of these books should suit their purses. I would not, however, be understood to allude to the learned Lepsius. His papers deal chiefly with unlettered languages. Nowhere would cheap books be of greater advantage than in India, but admitting the fact, we must admit also that *that* is not the whole, nor yet the main part of the question we have to decide. Every one will readily grant that it would be an immense convenience, and an immense advantage, to have a universal alphabet—if to the difficulty of learning a new language, we had not to add the difficulty of learning a new and perhaps complicated system of letters, bristling with hooks and points. In short, since the general introduction of steam navigation and rail-roads, &c., the idea of a universal alphabet seems quite natural. Nay, since almost all civilized nations, though thousands of miles apart, can now communicate with each other, by means of electricity, it seems strange that we should not ere this have had,—not a universal alphabet; but a universal language,—so strange that were Julius Cæsar to rise from his ashes, and to ask why all the world were not speaking and writing Latin, we should be somewhat puzzled for a ready reply. In regard to language, the curse of Babel would be a convenient if not a sufficient answer; but in the matter of the alphabets we could not unfortunately excuse ourselves so easily. It will not be a waste of time then to inquire why such has not taken place; and first I will state that I propose to look at the question, not as a theological, a philosophical, or an educational question—nor a question of expediency, nor of policy, nor yet one of price; but one simply of sounds and symbols: and viewing it as such, it does not appear difficult to assign reasons why the Roman alphabet could not take the place of all the alphabets which are now used in India with advantage to the languages themselves or the people who read and write them.

Dr. Sprenger, in his article, has given us illustrations from the

Arabic alphabet; but though he has dealt only with this one character, his proposal seems to be more comprehensive. In India, however, though we have a great many alphabets, all are off-shoots of two parent stems, or possibly in the remotest antiquity of only one. These two great progenitors of the large family of alphabets and modifications of alphabets with which medals and inscriptions have furnished us, are the *Pali*, or the true primitive alphabet of India, and the Phœnician, or Phœnico-Babylonian alphabets. Reading briefly the historic records of these alphabets, so far as they go, we find, that though the limits of the *Pali* language and its alphabets are not very accurately known, from the widely extended range over which *lât* and rock-cut inscriptions in this character have been found, we must concede to them an extensive domain. These inscriptions are chiefly to be found in the central belt and northern part of the Peninsula, and they carry us back 2,400 years, or to about 550 B. C. though probably the characters of this alphabet may have been in use at a much earlier period. The pure Sanskrit element would not seem to have made its appearance in India for several centuries later, or rather I should say, we have no *rock-cut* record of it. Coexistent with the *Pali* alphabet, which occupied the central division of India, for at least 250 years B. C., were the Bactrian alphabet of the North-Western, and the Dravidian languages, (apparently without any written characters) of the southern division of the Peninsula, the limits of the former extending almost to the confines of Persia, and those of the latter from the Vindian hills and the river Narbudda, to Cape Commorin. The early history of the Dravidian colony and their languages, is somewhat obscure; but there is internal evidence in the structure of some of their languages, viz. Tamil and Telugu, to prove that, though they have occupied the South of India from very remote ages, they were of Scythian origin, and it is assumed that they entered India by the same route as the Sanskrit-speaking people. Their languages then, though at present not wholly unallied to the Indo-Aryan family, are not of them; but their alphabets would seem to have been remotely derived from the same models, though how they came to differ in their existing forms so widely is not clear. That they are more modern does not admit of a doubt, but for the rest the matter is involved in much uncertainty. The points regarding which we are left in the dark are—When did the Sanskrit-speaking colony

come, and when they did come, whom did they find in India? Was it the original tribes of the country, and did they exterminate them so completely as to leave not a trace of their language—or was it an earlier emigration of Scythian colonists, and did they drive them southward before them so effectually as to leave no land-marks of their occupation behind them? These are questions admitting of much argument; but which I must leave to be discussed by those whom they concern—the students of language and ethnology, and turn again to our alphabets.

The Bactrian alphabet, on the contrary, owes nothing to the Indian model. It has been satisfactorily established that it is one of the many off-shoots from the Phœnician parent tree.

Now the Phœnico-Babylonic alphabet is the most ancient of which we have any historic record. Monsieur Renan in his *Histoire générale des langues Semitiques*, (probably following Gesenius who some twenty-five years previously had expressed a similar opinion,) thinks there is evidence sufficient to shew that the Hebrews wrote in this alphabet on going up out of Egypt. I cannot say any thing for or against this surmise; but be it as it may, there is little doubt that modifications of this alphabet were in spontaneous use from the banks of the Indus to the straits of Gibralter, by the people of the whole world as it was known to the ancients, about the eighth century before Christ. From it the Greek alphabet was modelled; from it the Aramaic, the Syriac, the Hebrew, the Arabic and the many modifications of these alphabets have sprung; *and from it, also, we have the Roman alphabet.*

It would be impossible in a brief, hurried, and imperfect memorandum, such as this, to give even a cursory outline of the history of the progressive development of these alphabets, even if I had full materials for the purpose; which is not the case. For a long time we had no better guide than Gesenius' work, published now some thirty years ago; but Dr. Levy's *Phonizische Studien*, and the duc de Luynes' valuable tables printed by Mr. E. Thomas, and since published inscriptions, have added much to the world's knowledge on this subject, which is at once so interesting and instructive to the palæographer, the philologer, and the historian. But still light is required,—more light,—and it is satisfactory to know that able scholars are deeply engaged in investigating the comparative palæography, as well as its

cognate subject, the comparative philology of Eastern languages. The East it is now acknowledged must be the starting point with all who would study the history of man as well as the science of language, and the art of writing. The last mail received from England, brought the announcement of the publication of no less than two books which promise to be of great value to all who are interested in these subjects, *Levy's Phoniziches Worterbuch*, or a sequel to his *Studien*, and *Spiegel's Eran das Land Zwischen der Indus und Tigris*, and our German oriental students work with such a will in the fields of oriental research, that we may confidently expect each year to increase our store of information. Whether they will succeed in finding Abraham, Zarathustra, and the leader of the Aryan colony which overran India, sitting under the same fig-tree, framing languages and alphabets for the whole world, is a question yet admitting of very great doubts, but there is no doubt that if ever they have done so, and left any traces behind them, our friends will find them.

Assuming the correctness of the facts above stated, it will be seen that excluding the immediate consideration of the Pahlawi and Zend alphabets, we have two primitive alphabets to deal with—the Indian and the Phœnician; and from these two alone the very numerous alphabets of almost of all the written languages of Europe, Africa, America, and half of Asia have been drawn.

We have the very best evidence moreover, viz. clearly written inscriptions on tablets, coins, and rocks,—to prove that many of these derivative alphabets are of very great antiquity, and this of itself, though not a practical objection to the substitution of a good for a bad, or a perfect for an imperfect alphabet, must nevertheless always present a very serious difficulty to the engrafting of *new* alphabets on *old* languages. Most nations take an intense pride in the antiquity of every thing belonging to them; and no nations possess this characteristic in a greater degree than Oriental nations. This difficulty, of course, is much heightened if the character in which the language is written, as well as the language itself, is sacred, which is the case with the two classical languages of India. It is almost superfluous to mention that the Brahmanas are of divine origin; that the language of the *Vedas* is the language of the gods; and as for their alphabet, its designation, the *Deva Nagari*, renders it unnecessary to say whence it has been derived. As if to give weight again to

their ideas regarding the antiquity of the Hindu era, its cycles have been elaborated into a system of *yugas*, which carry us back to ages quite sufficiently remote to satisfy the most ardent votary of the geologic theory.

Nor if we pursue the enquiry in the opposite direction, do we find greater encouragement for the reception of a change of alphabets. We cannot trace the Koran to its origin, for it was not created. The doctrine is one of the most noted heresies of Islamism. The *Koran* is co-existent and co-eternal with the Supreme Being, written in the Arabic characters on the *lawh i Mahfúz*, or sacred tablet, which is guarded by the angel Gabriel. As regards the Koran, moreover, an especial virtue is inherent not only in the words of the text; but in the actual letters in which they are written, for the *book* would not be the Koran, if transcribed in any others.

To obtain sympathy or support, then, from the *learned* in India, for any system that proposes the *general* substitution of a foreign alphabet for those they have been led to consider as sacred, I look upon as impossible. But were it possible, the difficulty of inducing any people to accept a new alphabet for the purposes of ordinary reading and writing, when they have one which they have used for centuries, which is already familiar to them, and which they find to answer all the purposes of life, is of itself of sufficient magnitude, to render it unwise in the advocates for so great a revolution, to encounter any obstacles that might be avoided. As an illustration of this minor difficulty, I may instance the Greek, the German, and the Russian alphabets, all of which still exist in certain portions of Europe, to the exclusion of the Roman alphabet, which has been adopted in all other countries. Some years ago indeed it was proposed to the Greeks to adopt the Roman characters; but the patriarchs rejected the idea with scorn. In Germany it has frequently, I believe, been attempted to introduce the Roman letters more generally, but except in books intended for exportation, the change does not appear to have found favour, and it is a singularly apt illustration of this difficulty, that the very articles in which Dr. Sprenger has so ably advocated the universal adaptation of Roman alphabet to Oriental languages, are printed in the old and familiar German type. Now the difference between the German and the Roman characters is comparatively trifling, and as the powers of the letters are precisely the same, for all practical purposes, the one alphabet

may be considered as good as the other. That the old alphabet then retains its hold on the Germans, furnishes us, in my opinion, with a strong proof of the very great tenacity with which a people will cling to an alphabet, when it has been so widely adopted as to have become familiar to their whole nation. Indeed, if experience is a guide, it would appear easier to change a language, than to change an alphabet.

These difficulties, however, it may be urged are, more or less, connected with the weaknesses of human nature, and may be traced to bigotry, vanity, prejudice, force of habit, false ideas of nationality, &c., all of which might be overcome by a ruling power occupying the position of the English in India; and this is in a great measure true; but admitting its truth, the most important part of the enquiry—indeed, I may say, the whole of the enquiry, will still remain, viz. the suitability of the characters of the Roman alphabet, to represent the sounds to be expressed in all the languages, both living and dead, which are in use in India. I have read a great deal that has been written on the subject, and I must confess that I have never seen this portion of it thoroughly well investigated. Indeed it is far more often settled in a very summary and off-hand manner, by a reference to some system which has already been adopted, and which has been used, it is advanced, with great success. Yet it is of the essence of the enquiry, and until it is satisfactorily disposed of, it is quite needless to refer to the many advantages that would result from the adoption of a universal alphabet, a point which I assume nobody will care to deny. Nor does the fact of a certain currency being obtained for books printed in a particular type prove what is wanting. Many people thought that putting pantaloons on Hindustanis would make English soldiers of sepoys; but it did not do so, a fact which the English discovered to their cost in 1857. After wearing them, father, son, and grandson for a whole century, on the very first favourable opportunity, they tore them off, and cast them away. And why, may I ask, did they do so? Because they found them not so suitable to their habits and customs, and the climate of their country, as the *dhotis* they had been in the habit of wearing for ages. The educated Bengalis have for a quarter of a century been familiar not only with the alphabet we use, but with the language we speak. They speak it and write it infinitely better than they do their own language, yet we do not find that when they write Bengali, they use this or any other

than the Bengali alphabet. How it would be, if the language and the Roman alphabet were familiarized, if I may use the expression, I cannot say ; a great many Bengalis now wear pantaloons, but in the matter of the alphabets experience, as at present available, is not certainly encouraging to a change.

It is surely not unnatural, that a people, after labouring for centuries to compass an important end, to invent and elaborate a system of signs and combinations of signs, and to apply them to every sound in their language, and having accomplished it, should be unwilling to resign that which had cost them so much time and trouble. The Deva Nagari alphabet, if it is the most elaborate, is also the most perfect alphabet in the world. It was modelled and improved from the Pali or most ancient Indian alphabet expressly for the Sanskrit language ; it was fashioned for this language ; it was made to fit it, and therefore it does fit it better than any other ; and it is a singular coincidence, that this fact attracted the attention of, and was noticed by the very remarkable Chinese traveller, Houen-thsang, upwards of 1000 years ago, and from his memoires, I make the following extract :— " Les caractéres de l'écriture ont été inventés par le dieu Fan, (Bramâ) et, depuis l'origine, leur forme s'est transmise de siècle en siècle. Elle se compose de quarante-sept signes, qui s'assemblent et se combinent suivant l'objèt ou la chose qu'on veut exprimer. Elle s'est répandue et s'est divisée en diverses branches. Sa source s'étant élargie par degrés, elle s'est accommodée aux usages des pays et aux besoins des hommes, et n'a éprouvé que de légères modifications. En général, elle ne s'est pas sensiblement écartée de son origine C'est surtout dans l'Inde centrale qu'elle est nette et correcte."

It is unnecessary to go into a comparative analysis of the two alphabets to establish the truth of these remarks. The coat that is made for a man is likely to fit him better, than the coat that is made for somebody else, and this, it appears to me is, if not the whole question, certainly the major part of it. " Yet" it will be urged by progressists, " fashions may change, and it would be unjust and a hardship, to condemn an ancient friend always to appear in his antique costume, because it had once, when in fashion, been made to fit him." I answer, that if it becomes him better than any other, it would be a far greater hardship, to make him change it to suit the taste or to please the eye of foreigners ; but even if he agreed to put on a new

coat, you would still be obliged to make one to fit him, and herein lies a very great difficulty." I consider it to be a fundamental principle of the art of palæography, that the power of each symbol should be so determined that its euphonic value in all combinations of symbols shall be fixed and not variable, as is the case with the Roman alphabet, as it has been adapted to English and some other modern tongues; that these values should be readily ascertainable, and that, as far as possible, distinct phonetic values should be represented by distinct symbols and combinations of symbols, and the same always by the same, wherever they occur. Now if we investigate the history of the progressive development of alphabets, we will find that while these rules have been steadily kept in view in the adaptation and modification of alphabets in the East, they have been systematically set aside in most modern languages of the West; and the result is, that while an educated Eastern gentleman, seldom or never makes a mistake in orthography, few Englishmen or Frenchmen can trust themselves to write their own language without a pocket dictionary at their elbow. There are again numerous letters in the Deva Nagari alphabet, for which we have no corresponding signs in the Roman alphabet, and many sounds in the former language of which no combination of the letters of this alphabet will convey to the ear even an approximate idea. And the same may be said of all the alphabets and languages derived from this source, and also, though in a less degree, of the Arabic and Hebrew alphabets. All attempts to express certain letters in the Arabic alphabet in Roman characters have failed, and for obvious reasons all future attempts will fail likewise. In short, if it be proposed to make the alphabet of any one language the basis of an alphabet for another language, its capabilities and powers must first be carefully examined with reference to the requirements of that language, and its redundancies eliminated, or its deficiencies supplied, as the case may require. This was the course adopted by the Brahmans in regard to the primitive alphabet of India, in the second and third century B. C., and this was the course adopted by the learned Lepsius in the 19th century A. D. when propounding his scheme for a missionary alphabet. He did not set up the doctrine that *any* existing alphabet, much less the Roman alphabet with its twenty-six letters, was perfect, in the universal application of the term. He assumed rather the converse, and the plan he adopted was as follows:—

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Having first arranged all the sounds prevailing in the known languages of the world, to these he applied the characters of the Roman alphabet as far as they would go, and for those sounds for which he could not find corresponding signs in the Roman alphabet, he indented on other alphabets, or invented new ones, adapting thus his alphabet to his languages, not *vice versâ*.

But if no existing alphabet is so perfect as to be made applicable to all existing languages, speaking generally, the alphabets of most languages which have received such a development as to entitle them to take rank as literary languages, and all those which may be distinguished as classical, have been so far perfected in relation to these languages themselves, and their symbols and sounds have become so closely identified, that any attempt now to dissever the one from the other, especially in the case of dead languages, would result in very serious consequences—indeed consequences so serious, in my opinion, as to give grounds for alarm, lest the true phonetic values of the original letters should soon become irremediably confused, and in the revolution of epochs, the languages themselves might be lost. This is a view of the case that will perhaps be disputed, yet it is one which will, I am sure, be clearly intelligible to all who have occupied themselves with decyphering ancient inscriptions, and are consequently aware of the stumbling block those inscriptions prove to archæologists, and numismatists, in which a language, foreign to the transcriber, has been rendered by the ear, in a character equally foreign to the language in which it is written.

I venture to consider it proven then, that the Roman or any other modern alphabet, cannot be applied to any of the dead or living languages of India for which an alphabet has been already perfected, with advantage to those languages, and that any attempt to do so, except in so far as the transcription may suit the convenience of foreigners and ripe scholars, would only lead to very great confusion.

It remains, however, to enquire whether, setting aside those languages, and *patois*, which have not been reduced to writing, we have no languages which have received a considerable development, but for which no written character, original or adapted, has been perfected. And here our attention is at once arrested by a language which is somewhat peculiar in its characteristic—a language which is written in many characters, yet which has no alphabet of its own; which has an ex-

tensive vocabulary; yet few words in that vocabulary can be said to belong to it; which is at once the most widely spread, the most popular, and the most useful of the languages of India, yet of which there is no definite form or dialect that can properly be called a language of any part of India; which cannot be developed without losing its identity, and yet which wanting, as it is, in all these, the attributes of a perfect language, has a grammatical structure which is essentially its own, and which it carries with it into whatever other language it may be merged. The language I allude to, is that which is commonly called Hindustani. It is the *lingua franca* of Hindustan, and is so universally familiar, that many I dare say will say that my remarks are paradoxical, and some that they are absurd. I venture to think that they are neither the one nor the other. But, as few will feel disposed to accept my simple word for the fact, I beg to offer the following explanation. The Hindustani language, as now existing, can hardly be called an independent language,—a language which springing from an original and ancient source, has existed, first in a primitive and rude form, and by a gradual and progressive development, always preserving its original basis, has finally received a polish, and been imbued with an elasticity, such as to make it a suitable medium for the expression of complex ideas. It cannot be said to belong to the Aryan; it certainly does not belong to the Semitic; it does not belong to the Scythian family of languages. It is a language, the elements of which are drawn from all these sources. The basis, that is the grammatical structure of Hindustani, if ever it was Sanskrit, is now so distinct from it, as to possess quite a character of its own, and its vocabulary is made up from languages both of the Aryan, Scythic, and Semitic families. It is so far then a composite language, but inasmuch as languages of distinct and separate origin will not readily mix, the moment any attempt at attaining a high degree of development is made, a conflict of elements takes place, which generally ends in the complete overthrow of one and the merging of what is called simple Hindustani into languages which, while they preserve in a great degree their Indian structure, indent for their vocabulary either on languages purely of Aryan, or purely of Semitic origin. This conflict is mainly attributable to the cause here assigned, the hostility of the primitive elements, and possibly of the races, but there can be little doubt that it is greatly fostered and encouraged by the maintenance of a double alphabet, and

the difficulties of fusing these opposite elements, into a composite language, in the ordinary acceptation of the words, would be considerably diminished if an alphabet could be invented that would be common to both.

The Deva Nagari alphabet is quite as unsuitable for expressing Arabic and Persian words, as the Greek alphabet is unsuitable for expressing Sanskrit words pure and derivative, and the language as now written, presents as *bizarre* and *outré* an appearance, as if a language composed of English, German, and Russian words, was written in Hebrew characters. In most composite languages, such as English or the Romance languges, the whole forms an amalgam in which sometimes, the original materials can be recognized with difficulty, and often not at all, as all will be aware who have read Dean Trench's works on the English language. But in Hindustani it is different, the materials, particularly those of Semitic origin, remain exactly as they were, and it is the same with modern Persian in regard to its Arabic words, which Sir William Jones has well illustrated in the following passage. "This must appear strange to an European reader; but he may form some idea of this uncommon mixture, when he is told that the two Asiatic languages are not always mixed like the words of Roman and *Saxon* origin in this period, 'The true law is right reason, conformable to the nature of things, which calls us to duty by commanding, deters us from sin by forbidding;' but as we may suppose the Latin and English to be connected in the following sentence: "The true *lex* is *recta ratio*, conformable *naturæ rerum*, which by commanding *vocet ad officium*, by forbidding *à fraude deterreat.*" But the difference in the case of Persian is, that it and Arabic have a common alphabet while the two languages of which Hindustani is chiefly composed, have separate and distinct alphabets.

The obstacles again to fusion under present circumstances are greatly increased by distinctions of race and creed. Without entering into nice ethnological distinctions, it will be sufficient to consider that we have in India two great classes to deal with, Hindus and Musalmans. The former, in writing Hindustani, use the Deva-Nagari, or one of its derivative alphabets; the latter generally use the *Nas Táliq* or Persian character. Neither know the characters in which the others write, and as the races are prevented by religious differences from intermixing, there is neither inducement nor necessity

for improving their acquaintance with each other's customs in this respect. When letters pass between two educated gentlemen of different race and creed in India, though written in what may be called the mother-tongue of both, they must be taken to the village scribe to be read. This certainly is an anomaly—an anomaly which does not exist perhaps in any other part of the world. But we have not yet reached the end; we are introducing railways, telegraphs, and all kinds of mechanical power into India, and we are teaching sciences bristling with technical terms. A medical student who may be unable to speak a word of English, will glibly run over half the Latin terms in the pharmacopœia of medical science, and any ordinary native gardener will give the Latin botanical name for every tree and flower in a well-stocked garden. We have here, then, not an alphabet seeking for a language; we have a language seeking for an alphabet. It has greater natural claims perhaps on the Deva Nagari alphabet than upon any other, because the language, in its ancient dialectic form must have been closely allied to the Sanskrit, and the present Deva Nagari alphabet was formed from the Indian alphabet; but certain portions of the frame-work of the language are so distinct as to be deduced with difficulty from Sanskrit, and if English, Sanskrit, Arabic, and Persian words are to be adopted into the language, and one of the three alphabets is to be selected to be a common alphabet for all races who use this language throughout the country, the balance, on many grounds, is in favour of that alphabet which is used by the most highly civilized people—the ruling power.

Certainly very great difficulty would attend the inaugural measures of a comprehensive change of the kind; but these I need not discuss here, further than to add that any attempt to accomplish so great an end, must be made gradually, and with much caution.

But besides Hindustani, it must be borne in mind, that there is a very wide field that the Roman alphabet may occupy at once. I allude to the very numerous dialects which we find in all parts of India to which the civilization of the Budhists and Brahmins have not penetrated. In the province of Assam and neighbouring districts, we have eight different dialects which, are stated to be distinct languages,* having no affinity with one another.

* 1. Garow.
2. Naga.
3. Booteah.
4. Khassiah.
5. Abor.
6. Mishmee.
7. Kamptee.
8. Mikir.

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This is probably a mistake; but these languages are still so distinct as to be a bar to intelligible inter-communication. In addition to these, there are numerous dialects, presenting, for the most part, the characteristics of the central-Asia type of languages; but all differing from each other in a greater or less degree, and almost all not yet reduced to writing. The same remarks are applicable to Birmah proper, British Birmah, Pegu, the Tenasserim Provinces, Chittagong and Akyab.

The great majority of the languages here alluded to, having no affinity with Sanskrit, the Deva Nagari alphabet cannot be said to have any peculiar claims on them. The Missionaries on the North East frontier have adopted the Roman characters in their teachings, while the Missionaries on the South East frontier have adopted the Burmese characters. Now, much may be said against teaching uncivilized tribes a character that will not enable them to carry on business relations in writing with their neighbours; but if it is ever intended to apply the Roman alphabets to *any* of the languages of India, the best languages certainly on which to experimentalize, are those to which no alphabet has yet been naturalized.

The Missionaries in British Birmah are making very rapid progress with the instruction in Burmese and the conversion to Christianity of the Karens, and the Welsh Presbyterian Mission at Cherrapoonjee are printing some books and a dictionary in the Roman characters. The Education Department in Assam first adopted the books of the Missionaries, but have discarded them, I believe, for books printed in Bengali type. The question therefore ought to be authoritatively settled, or we shall see, what it must be confessed is not uncommon in India, one generation taking infinite pains to do that which the next will take equal pains to undo.

The conclusions then at which I have arrived are, that any attempt to adopt the Roman alphabet to the classical languages of India would be mischievous; and that all those languages for which an alphabet has already been perfected by the people speaking them, have no need of such a change; but that an attempt might be made to adopt this alphabet, or a modification of it, to all Indian languages which at present have no alphabet which can properly be called their own.

On the Buddhist Remains of Sultánganj.—*By Bábu* Rájendralála Mitra.

Ascending the Ganges from Bhágalpur, the first object of interest which arrests the attention of the traveller is a singular mass of granite towering abruptly to the height of about a hundred feet from the bed of the river. Its natural beauty and romantic situation have long since dedicated it to the service of religion; and Jangirah, the name of the rock in question, has been associated with many a tale of love and arms. It stands at a distance of about a hundred yards from the right bank immediately opposite to the mart of Sultánganj, and is surmounted by a small stone temple which is visible from a great distance, and serves as a beacon tower to the mariner. The presiding deity of the sanctuary is named Gaibinátha, a form of S'iva whose identity I cannot ascertain. Along with him are associated a number of statues and images whom the resident priests hold in such slender respect that they did not object to my scratching some of them with a penknife to ascertain the nature of the stones of which they are made.

The temple bears no inscription, and the attendant Brahmans could not give me any information regarding its history. Judging, however, from its make and appearance, I believe it cannot be more than two or three centuries old. Around it are situated a few low rooms for the accommodation of the priests.

The face of the rock is covered by a number of bassi-relievi, most of which are Hindu and include representations of Ganes'a, Hanumána, Krishṇa, Rádhá, Vámana, Ananta sleeping on a snake, S'iva and other Pauraṇic divinities. But there are a few which are decidedly of Buddhist and Jain origin. The Buddhist figures, mostly Buddha in the meditative posture, occupy more centrical positions than the Hindu ones and appear to be more worn away than the latter; both circumstances affording conclusive evidence of the place having been originally a Buddhist sanctuary which the Brahmans have appropriated to themselves since the downfall of Buddhism. A Jain temple still exists on one side of the rock to which a few pilgrims occasionally come to offer their adoration to Páras'wanátha the 23rd teacher of the sect.

There is only one place at the foot of the rock at which a boat can be put in where there is a landing-place, and thence a very steep and winding path leads to the summit.

According to Montgomery Martin, at the three sacred full moons, in October, January and April, (Bengali Kártika, Mágha and Vaisákha,) from twenty to thirty thousand persons attend to bathe at this place; "but the great emolument of the priests arises from about 50,000 pilgrims who at various times come to carry away a load of water which they intend to pour on the head of various celebrated images in distant parts. In the south of India I have met pilgrims carrying their load from this place; but by far the greater part goes to Devaghar in Virabhum where it is poured on the Priapus or Linga called Baidyanátha, to whom this water, taken from a scene of former pleasure, is considered as peculiarly acceptable."*

To the east of this rock on the river bank there is another mass of granite having a few carvings on its western face, and a brick-built mosque on the top of it called the *Dargah of Baishkaran.*

The village of Sultanganj stretches westward to the extent of about a mile from the foot of this rock. In a line with Jangirah the position of the village is Lat. 25° 19′ 20″ N.; Long. 86° 48′ 25″ E. At the time of Mr. Martin's survey, forty years ago, it contained about 250 houses, of which only two were brick-built and three tiled. The number of houses has now quintupled, and the main road in front of the mart which gives name to this place, is lined by a good many pucka godowns.

The railway station of Sultánganj stands behind this mart and at a distance of about half a mile to the south of it.

The space between the mart and the railway station forms a quadrangle of 1,200 feet by 800. It seems never to have been under much cultivation, and is covered by the debris of old buildings, the foundations of which have lately been excavated for ballast for the railway. The trenches opened along the line of the foundations are not continuous, and in several places have been filled up, but from what remains I am disposed to believe that the place was at one time divided into courtyards having lines of small cells or cloisters on all four sides. This idea has been strengthened by the discovery of a series of six chambers in a line at the south-western corner of the

* Martin's Eastern India, Vol. II. p. 38.

quadrangle. These chambers form a part of the western side of a large courtyard on the north of which Mr. Harris, Resident Engineer, East Indian Railway, under whose superintendence the excavations under notice have been carried on, has brought to light the foundations of two similar chambers. The southern and the eastern façades yet remain unexplored. But the accumulation of rubbish on those sides, rising to the height of 10 to 20 feet, clearly indicates that chambers corresponding to those on the west and north are to be met with under it.

At the middle of this long ridge of rubbish Mr. Harris has found the foundation and the side pillars of a large gateway which was evidently one of the principal entrances to the quadrangle. Similar gateways probably once existed on the other three sides, but their vestiges are no longer traceable.

The accumulation of rubbish at the south-east corner is greater than any where else, and on it is situated the bungalow of the Resident Engineer. It would be well if a shaft could be run through this mound, as it is here that relics of importance are most likely to be met with.

The chambers excavated at the south-western side are not all of the same dimensions. They measure within the walls from 12′ × 10′ 6″ to 14′ × 12′. The depth from the top of the plinth to the lowest part of the foundation (the only portion now in situ) is 13 feet. This depth was found full of earth and rubbish, but divided at intervals of 3 or 4 feet by three distinct floors formed of concrete and stucco. The lowest shews no trace of plaster. The upper floors had openings or hatchways through which people descended to the bottom, and used the different stories as cellars or store-rooms. No valuable property or remains of corn or other goods have, however, been traced in these cellars, as most probably they had been removed before the monastery fell into the hands of the destroyer.

The interior of the walls had never been plastered, but the front, facing the courtyard, has a thick coating of sand and stucco such as are to be seen in modern Indian houses.

The bricks used in the building of these chambers measure 13″ × 9″ × 2½″, and in density, colour and appearance are similar to those employed in the construction of the great temple at Buddhagayá. At Sánchi, Sárnáth and other old Buddhist remains, bricks of such large size appear to have been common, and they give a pretty close

idea of the era when they were most in use. The largest bricks known are met with in the ruins of Hastináp̃ur, which, according to Mauluvi Syad Ahmad,* measure 20 inches long, 10 broad and 2½ thick. If they be, as has been supposed, synchronous with the heroes of the Mahábhárata they are the oldest as well as the largest known. The next in size are those from the walls of Babylon, for which the clay thrown out of the trenches surrounding the city supplied the material; they measure sixteen inches square, with a thickness of three inches. The next are those from the pyramid of Howara in Egypt. They measure 17¼ inches by 8¾ inches; the thickness being 5¼ inches. Next to them are those of Buddhagayá, Sárnáth, Sultánganj and other Buddhist localities; they vary from 13″ to 14″ by 8″ to 10 inches, the thickness ranging from 2½ to 3½. This kind of brick, was in use for upwards of seven hundred years down to the fifth or sixth century of the Christian era. The bricks of the Hindu Rajas of Lilput, Avangpur, Luckerpoor are much of the same size, but of very different appearance. The early Pathans also used very large bricks, and in old Delhi they are very common. The later Pathans reduced the size of their bricks to 12 inches, and in the days of the Moguls they were further reduced to 10″, hence it is that in the many palatial buildings of Akbar, Jehangir and Shah Jehan, the greatest builders of the race, we find no trace of a single large brick.

Beyond the western wall of the chambers there is the foundation of another and a broad one, which formed the boundary wall of the quadrangle. It runs due north and south and is joined by one which runs along the ridge on the southern side. Similar boundary walls, no doubt, once existed on the north and the east, but their traces have long since been effaced.

In front of the chambers there are to be seen the remains of a hall or verandah which formerly formed the most important part of the building on this side of the quadrangle. Its floor is on a level with the highest floor of the chambers, and seems to have been made of concrete and stucco, and painted over in fresco of a light ocherous colour. How it was enclosed in front has not been made out. Probably there was a range of square pillars, forming a verandah or pillared hall resembling a modern Bengal *dalan* or the *choultry* of Southern India. The floor of the courtyard has not yet been laid bare, but judging from

* Journal of the Archæological Society of Delhi, p. 50.

the position of a water-course formed of scooped flags of granite which runs under the floor of the hall and through one of the partition walls of the chambers to a drain beyond the boundary wall of the quadrangle, and which was evidently intended to carry off its drainage I am induced to believe that it stood about 3 feet lower than the hall. Similar water-pipes of granite have been met with at Buddhagayá, Sárnáth and elsewhere.

Of the relics which have been collected by Mr. Harris in course of his excavations at this place, the most important appears to be a colossal figure of Buddha which was found lying on a side of the hall described above. It had evidently been knocked down by some iconoclast before the destruction of the hall, and removed several feet away from its pedestal. The latter too had been tilted over, but not much removed from the centre of the hall which was its original position. It was formed of a slab of granite 6′—11″ × 3′—9″ the thickness being 9½ inches. The statue was secured to this stone by two bolts, the remains of which are still visible. The statue is of copper and seems to have suffered no injury from the hands of the destroyer, except the mutilation of the left foot across the ankle.

Its dimensions are—

From the topknot on the crown of the head, along the back to the edge of the heel,	7 3
From do. along the front to the sole of the foot under the instep,	7 6
Round the head,	2 0
Topknot,	0 3
From bottom of topknot to forehead,	0 2½
Length of face from forehead to chin,	0 10
From chin down to wais.,	2 0
From waist to sole of foot,	4 0
Round the breast,	6 7
Across the shoulders,	2 4
From shoulder-joint to elbow,	1 6
From elbow to wrist,	1 0
From wrist to end of middle finger,	1 0
Foot from heel to end of 2nd toe,	1 ½

The above measurements were taken with a common tape without any reference to the principles followed by artists in the calculation

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of the relative proportion of the different parts of the human figure. They disclose, however, some curious facts: thus omitting the top-knot formed of a collection of hair on the crown of the head, we find that the total length of the figure (7 feet) is to the head (12⅛ inches,)—as 1 to 6 and $\frac{19}{97}$, or in the language of artists 6 heads, 3 parts, 9 minutes, instead of the usual standard of 1 to 8, and also considerably under that of the antique statues. In the Hercules the Apollo and the Laocoon the length of the body varies from 7 heads, 2 parts, 3 minutes to 7 heads, 3 parts, 7 minutes. The tallest statue known is that of Mirmillo, and it measures 8 heads only. The length of the fathom again, which in Europe is reckoned to be the same as the height, is in our statue fully one-third more. This is owing no doubt to the belief common in India that the simian pecularity of the hands reaching down to the knees is an emblem of divinity and universal sovereignty. It is worthy of note, however, that in a table published by Dr. Emil Schlagintweit in his recent work on Tibetan Buddhism,* the fathom of Brahmans of Upper India, is represented to be greater than the length of their body, and the Bhots have the same peculiarity in a greater degree. It is remarkable also that the latter make their Buddhas and Bodhisatvas have shorter fathoms than their genii and dragsheds. The increase in the fathom is effected by an inordinate prolongation of the hands, leaving the arm and forearm less than their natural proportions as compared to those of Indian Brahmans, of Bhots, and of Bhotanese idols; but somewhat longer than the European standard of 1 head, 2 parts and 3 minutes to the arm and 1 head, 1 part and 2 minutes to the forearm. The foot, according to modern artists, should

* I take the following from Dr. Schlagintweit's book to bring to one view the relative proportions of the different parts of the human figure compared with those of Bhot statues. The second column A has been added by me.

	A. Buddha from Sultanganj.	B. Brahmans of Upper India.	C. Bhots.	D. Buddhas, Bodhi-Sattvas, of Tibet.	E. Dragsheds, Genii, Lamas, of Tibet.
Total height, ...	1.000	1.000	1.000	1.000	1.000
Head, ...	0.119	0.145	0.149	0.166	0.160
Periphery round the forehead,	0.285	0.322	0.345	0.350	0.420
Length of Fathom, ...	1.342	1.025	1.069	1.080	1.117
Ditto Arm, ...	0.214	0.433	0.451	0.449	0.430
Ditto Forearm, ...	0.142	0.165	0.164	0.149	0.155
Ditto Hand, ...	0.142	0.107	0.110	0.110	0.110
Ditto Foot, ...	0.148	0.144	0.145	0.140	0.144

be one-sixth of the body, but in the statue this has been exceeded by a few minutes. The torso is slightly shorter than the Grecian standard. On the whole, even after making ample allowances for the fact that the changes which the human form undergoes from infancy to old age and in different nationalities and climates preclude the possibility of limiting its measurements to any ideal standard, it must be admitted that the artist of the statue had a very imperfect knowledge of proportion. He had evidently adopted the tall North Indian and not the squat Bhot for his model.

The figure is erect, standing in the attitude of delivering a lecture, and in this respect bears a close resemblance to the sandstone statues so largely found at Sarnath by General Cunningham. The right hand is lifted in the act of exhortation; the left holds the hem of a large sheet of cloth which is loosely thrown over the body. Both hands bear the impress of a lotus, the emblem, according to Indian chiromancy, of universal supremacy, and as such is always met with on the hands of Vishṇu, Brahmá and some other Hindu divinities. The ears are pendulous and bored, and the hair on the head disposed in curled buttons in the way they are usually represented on Burmese figures, and not very unlike the buttons on the heads of some of the Nineveh bas-reliefs. The lips are thin and the face, though more rounded than oval, is not remarkable for any prominence of the cheek bone. On the forehead there is a circular *tilak* or auspicious mark.

The material is a very pure copper cast in two layers, the inner one in segments on an earthen mould, and held together by iron bands which were originally ¾ of an inch thick, but are now very much worn down by rust. The outer layer of the copper has also oxidized in different places and become quite spongy. The casting of the face down to the breast, was effected in one piece; the lower parts down to the knee in another, and then the legs, feet, hands and back in several pieces. A hole has been bored through the breast, and chips have been knocked off from other parts of the body since the exhumation of the figure, evidently with a view to ascertain if it did not contain hidden treasure such as is said to have been found by Mahmood in the belly of the famous idol of Somnáth, but it has led to the discovery of nothing beyond the mould on which the figure had been cast. The substance of this mould looks like a friable cinder. Originally it consisted of a mixture of sand, clay, charcoal and paddy husk,

of the last of which traces are still visible under the microscope. Bábu Kánailála De, Assistant Professor of Chemistry, Medical College, who kindly undertook to analyse this black stuff for me, says that it consists of—

Silica, ...	73	50
Oxide of copper, peroxide of iron, alumina, lime, and magnesia, ...	18	0
Organic matter and moisture, ...	8	50
	100	00

On the annexed plate, which has been drawn from a photograph, the statue is represented with two small figures on its sides. These were found close by it in the chapel hall. They measure 1′-10½″ and 1′-5″ inches high respectively. They are carved in basalt and, in style and attitude, bear a very close resemblance to the copper statue; but they have each an attendant devotee kneeling before it with folded hands, and the Buddhist creed "*Ye dharmáhetu*" *&c.*, engraved in the Gupta character on the pedestal. The small one has the same also on the back.

Among the other relics found I may mention—

1. A mutilated terra cotta figure similar to the above.
2. A large conch shell (sankh), its animal matter nearly all destroyed.
3. A great number of cowries not much affected by time.
4. A piece of elephant bone—the top of the tibia sawn both across and longitudinally, the sawing mark most distinctly visible.
5. A slip of ivory about a foot long and an inch broad; flat but not sharp: edged.
6. An Iron axe destroyed by rust, but the shape is distinct.
7. Ditto smaller.
8. Ditto very much destroyed; the ring broken off.
9. An Iron ring about three inches in diameter with a spike on one side, very much destroyed by rust.
10. A chisel with an iron handle, very rusty.
11. A copper disk or cover destroyed by rust.
12. Sitting figure of Buddha in copper, partially destroyed by rust.
13. Three standing figures in do. do.; the heads had halo which were found broken and detached.
14. The hand of a large copper figure.
15. A number of broken bits of rusty copper domestic utensils.
16. Lumps of copper ore.

17. A miniature copper bell.

18. A fragment of a crucible.

19. Lumps of clay of the same composition as the crucible.

20. Fragments of enamelled earthenware; black and variegated patterns.

21. A miniature teapot, broken;—vessel about an inch and a quarter, with a spout.

22. Miniature terra cotta chaityas, containing within the seals of the Buddhist creed, some having seals stamped on the bottom.

23. Ditto having the figure of nine chaityas stamped on its sides and of seals at the base.

24. Several of the above seals detached.

25. Balls of earth pear-shaped and perforated.

26. Cylinders of do.; both probably intended for nets, to make them sink fast.

27. A number of pebbles.

28. Fragments of red ocherous rock.

29. A number of terra cotta lamps, circular, flat-bottomed, the spout not very projecting.

30. Handles of terra cotta frying-pans.

31. Fragments of handles, spouts and covers of earthenware vessels much stronger than ordinary.

32. Ditto of terra cotta basso-relievo figures, red-glazed.

33. Head of Vishṇu in baked clay, seasoned with paddy and glazed in red, with the seven-headed cobra over head (the only Hindu relic met with).

34. Well formed heads of *surki* cement plastered with stucco, one with a particularly beautiful profile.

35. Hands and feet of do.

36. Fragment of a tile with basso-relievo figures of palms.

37. A bit of crystal.

38. A round hollow piece of iron covered with copper gilt and stamped with the figure of a chaitya on each side.

39. Fragments of encaustic tiles.

40. Fragments of white stucco coloured red in fresco from the floor under the great copper statue.

41. Fragments of cylinders, red-glazed.

42. Fragments of terra cotta ornaments.

43. A number of bivalve shells.

44. Lamps of stone, similar in shape to No. 29.

The articles named above leave no doubt as to the nature of the building in which they have been found. The quadrangle was evidently a large Buddhist monastery or *Vihára*, such as at one time existed at Sárnath, Sánchi, Buddhagayá, Manikyálá and other places of note, and at its four corners had four chapels for the use of the resident monks. Two of these which abutted on the mart have already disappeared, and of the other two, that on the south-west has yielded the relics noted above, and the last remains under the railway bungalow, a most promising field for the antiquary who could devote a week or two to its exploration.

Of the history of this Vihára nothing is now traceable. From its extent and the style of its construction, it is evident that at one time it was a place of great repute, and the resort of innumerable pilgrims. But its glory set a long while ago, and even the name of the place where it stood is now lost in obscurity. The present appellation (Sultánganj) is quite modern, not more than two or three centuries old, and is due to a prince of the house of Akbar. Fa Hian makes no mention of it, and Heuen-Thsang talks of the ruins of several large monasteries in the neighbourhood of Bhagulpore, but gives us no clue to the one under notice. It is to be presumed therefore that it had been ruined and forsaken, or at least had fallen into decay, before the advent of the latter Chinese traveller. The inscriptions on the minor figures, in the Gupta character of the 3rd and 4th century, shew that the Vihara with its chief *lares* and *penates* had been established a considerable period before that time, probably at the beginning of the Christian era or even earlier, for Champa (modern Bhagulpore,) was a place of great antiquity and the Buddhist took possession of it very early as the capital of Eastern India, and established many Viháras and chaityas in and about it. Though most of these have been destroyed by the ravages of time and the ruthless hands of adverse sectarians, there still stand in its vicinity two round towers, each about seventy feet high, the names of whose founders and the object for which they had been built have long since been forgotten, but which from their close resemblance to the *pyrethra* so common in Affghanistan and elsewhere, are evidently Buddhist monuments of yore.

Though the principal residents of Buddhist monasteries were priests

who were sworn to celibacy and poverty, who shaved their heads, wore the simplest garments, and earned their subsistence by alms, still the Viháras of old were not without the possession of considerable wealth, and the proximity of a mud fort was always deemed a desirable source of security. Hence it is that large mounds, the remains of former mud forts, are generally met with in the neighbourhood of extensive monasteries. At Sárnáth a fort stood within five hundred yards of the Vihára, at Buddhagayá one was situated within a stone's throw of the great temple, and at Kusia and elsewhere the like may be seen within very short distances. It was to be expected therefore that at Sultánganj there should be a fort within hail of the monastery, and accordingly we find one to the west of it at a distance of about three quarters of a mile—a square mound of about 400 yards on each side raised to the height of about 20 feet from the plain, and now the site of an indigo factory. To the south of it there is a large tank which yielded the earth of which the mound was formed.

Another peculiarity in which the Vihára at Sultánganj bears a close resemblance to Buddhist monasteries in other parts of India, is the great abundance of the little fictile bell-shaped structures called *chaityas*. They occur either in alto-relievos as No. 22, or in bass-reliefs stamped on small tiles, as No. 23. The former generally have the Buddhist creed enclosed within or stamped at bottom, and the latter the same stamped below the figure of the Chaitya. The type seems to have been conventional and common all over India. Mr. E. Thomas found the exact counterparts of these at Sárnáth, General Cunningham noticed them at Bhilsa, and I have seen some brought from the ruins of Brahmanabad in Guzerat and now in the possession of Lady Frere. A short time ago Colonel Phayre sent a few tiles to the Asiatic Society from Burmah which, though shaped differently, and intended to hold the figure of Buddha in the centre, have the chaityas and the inscriptions so exactly alike that they may easily pass for relics from Sárnáth or Sultánganj. The inscriptions on all these are in the Kuṭila type which had a long range of four centuries from the 8th to the 11th; the monuments on which they are found, must have therefore existed at least down to the 7th, 8th or even the 9th or 10th century. The Kuṭila characters, however, could not have been current in some of the countries where they are met with, such as Burmah and Guzerat, and must have therefore been adopted as mystic or sacred

symbols in these places. It is remarkable at the same time that while the characters remained intact the "creed" failed to withstand the change of climate, and underwent several alterations of reading.

These structures are models or miniature representations of sepulchral monuments, and they owe their origin to an injunction in the Bhuddhist scriptures which recommends the dedication of such monuments as an act of great religious merit. Hence they have engaged the earnest attention of the followers of Gautama from an early age, and many are the ruins in India which now attest the lavish expenditure which some of its former kings and princes incurred in raising them in a manner worthy of their ambition.

They were originally hemispherical in shape and of stupendous size, rising directly from the surface of the earth like a bubble on water, and typical of the evanescent character of all worldly objects.* They are represented by the topes of Sánchi and Sátdhará, which, according to General Cunningham, date as early as the 6th century before Christ, but which certainly must have existed since the fifth. Two hundred years subsequently, about the time of the third synod, the hemispheres were raised on cylindrical plinths of small height as in the chaityas around Bhilsa. Gradually the plinths were raised higher and higher, until, in the beginning of the Christian era, their altitude became equal to the diameter of the hemisphere, as at Sárnáth near Benares and in the topes of Affghanistan; and ultimately they merged into tall round towers surmounted by a dome, or bell-shaped structures with elongated pinnacles, such as the Dehgopas of Burmah or the bass-reliefs on the clay figure under notice. These were costly edifices and could be constructed only by the wealthy. But as the merit of dedicating them was not dependent upon their size, men of moderate means satisfied their religious craving by the consecration of small stone models which the clergy assured them would secure to them as much merit as the lordly structures would to their princely donors. They added that vows to dedicate such tokens were most effectual in averting an impending evil or securing an expected good. Thus a great impulse was given to this act of devotion, and the number of offerings was greatly multiplied. The poor supplied the place of stone models by little terra-cotta figures of small value, the offering of which was very much encouraged by the priesthood, as their consecra-

* Vide Cunningham's Bhilsa Topes, p. 169.

tion afforded the latter a small but constant source of income.* A similar cause in the present day promotes the offering of fictile models of horses to *Satyapir* and other local saints, and hundreds of them may be seen about every consecrated Banian tree in Bengal. The Buddhist figures were made after various designs and in different ways, but generally they were either cast in moulds or stamped on plastic clay. The basso-relievo tiles appear to be the most common. They contain figures of 1 to 20 or 30 chaityas impressed on them, and sometimes have also a figure of Buddha in the centre. In India they have preserved their independent character as objects of votive offering, but in Burmah they have been largely used in the ornamentation of temples and monasteries. That most if not all of them were, however, at one time votive offerings, is evident from the fact of many of them containing inscriptions recording the name of the donors. On the back of one of Colonel Phayre's tiles (No. 1) which was taken from the "upper layer of the arch of the relic chamber" of a temple at Pugán in Burmah, and which has the figures of 30 Buddhas and two chaityas impressed on it, there is a corrupt Mágadhi inscription in rude Burmese characters, which states that the tile was dedicated by one for the good of his parents and of all Buddhas past and to come. The words of the inscription as read by Burmese scholars have already been published, (ante p. 57) but as no attempt has yet been made to translate them and the reading appears to me to be incorrect, I here supply a different version together with a tentative translation. The reading I propose is :—

Aṭawisati mé buddha
Tiñsasammékona saha
Buddha ṭya tatta iya
Sabbán mátu ṗitu ara
Chariya putta ra a cha
Sabba satta hitá picha
Buddhá hitáti nágateti.

Translation—To the 28 Buddhas together with the 29th and the 30th, for the good here and hereafter of all, of my father and mother, of my tutor and his son, of all living beings, as also for the good of all Buddhas past and to come.

* Vide Col. Sykes' Note on the Miniature Chaityas, &c. in the Journal Rl. As. Soc. Vol. XVI. p. 37.

COLOSSAL COPPER STATUE OF BUDDHA

Notes on the Didunculus Strigirostris, or Tooth-Billed Pigeon of the Navigator Islands—the nearest living Ally to the extinct Dodo.

Communicated by Sir W. Denison.*

[*Received 4th Dec.*, 1863.]

Many of your readers, and especially those interested in natural history, will be glad to hear that the long lost tooth-billed pigeon, *Didunculus strigirostris*, is not quite extinct, as is generally supposed. This fact is now satisfactorily proved by a living specimen having been brought up to this city [Sydney] by Mr. J. C. Williams, H. B. M. Consul for the Navigator Islands, from Upolo, one of that group.

It will be needless to enlarge upon the great service thus rendered by Mr. Williams. Let it suffice to say that it is the only *living* specimen which has ever come under scientific notice, and in all probability will remain so. Scientific societies, both in England and Europe, have offered large rewards for this interesting bird, but it is to be hoped that if our Acclimatisation Society does purchase this bird, it will not share the fate of other rare specimens, and be sent out of the colony.

Mr. Williams has kindly allowed me to examine his specimen, which is still in Sydney; and has given me the following information respecting its habits, of which nothing has been previously made known.

The didunculus, or gnathodon, is known by the natives of the Navigator's under the name of the *manu-mea*. It was at one time very plentiful on those islands, and particularly upon Upolo, where Mr. Williams obtained his specimen; but owing to the number of cats which, having become wild, now infest the islands, this peculiar bird has become almost extinct. The natives also have had a share in its destruction, for as long as the birds could be procured in tolerable numbers, they were in the habit of making annual excursions into the mountains for the sole purpose of catching and feasting upon them. The game was secured either with bird-lime, made by mixing the sticky gum of the bread-fruit tree with oil, or by means of nets fastened to the end of long light poles and thrown over their victims, which were enticed within reach by tame decoy-birds kept for this purpose.

* These notes, apparently by Mr. Ramsay, Sir W. Denison's correspondent, comprise a printed extract from a Sydney newspaper, and a MS. description of the bird.

The manu-mea is strictly a ground pigeon, giving preference to the thickly wooded sides of the mountains, which, when these birds were plentiful, they traversed in flocks from ten to twenty in number, feeding upon various berries, and particularly upon the mountain plantain, for which they had a great liking.

When forced to take wing, they rose with a great flapping noise, which was so characteristic that even up to the present time, the saying, "as noisy as a manu-mea," is common among the natives.

The only note observed by Mr. Williams is a low plaintive cry something resembling that of a chicken, but not so shrill, nor repeated so often. The specimen which Mr. Williams has, is now about the size of our common domesticated pigeon, but as it is yet quite a young bird, it will probably grow much larger.

The natives still keep up the practice of pigeon feasting, and are using their best endeavours to exterminate the little brown ground dove, peculiar to the Navigator's Group, although at present this species still seems to be very plentiful.

In the photograph there is apparently a sort of crest on the head of the bird, this is caused by a gathering from the bird knocking himself about in its cage, it is only the feathers sticking out from the top of the head.

Didunculus Strigirostris.

Bill orange yellow at base, light horn colour nearing the tip, which is almost white with a dark line down the ridge, skin round the eye cere, fleshy orange very like the ordinary colour of Pigeon's feet, feet of colour more like the base of the bill. In the young bird the head and neck are dull slaty blue with a tinge of metalic green ; breast dull dirty brown, abdomen same colour, tail and upper tail coverts, middle of back deep chestnut brown ; wings brown, many feathers barred with red deep chestnut. The iris hazel brown ; skin round the eye, fleshy orange. The second bird was very like the adult specimens figured in Gould's works, but not so bright.

Memorandum on the Elephant Statues in the Delhi Palace.—By Col. J. Abbott.

[*Received 2nd December*, 1863.]

In the last number of the Society's Journal, No. III. of 1863, I have read with interest General Cunningham's remarks upon the life size statues found in the Royal citadel at Delhi.

As I happened to be at Delhi when these statues were disinterred, I had opportunity of examining them and at once recognised the long sought statues, mentioned by Bernier in these words.

"The entrance of the fortress presents nothing remarkable besides two large elephants of stone placed at either side of one of the principal gates. On one of the elephants is seated the statue of Jemel (meaning no doubt Jye Mul) the renowned Raja of Chitore. On the other is that of his brother Polta (Putta). These are the brave heroes who, with their still braver mother, immortalised their names by the extraordinary resistance which they opposed to the celebrated Acbar; defending the towns besieged by that great emperor with unshaken resolution and being at length reduced to extremity, devoted themselves to their country, and chose rather to perish with their mother in sallies against the enemy, than submit to an insolent invader. It is owing to this extraordinary devotion on their part, that their enemies have thought them deserving of the statues here erected to their memory. These two large elephants, mounted by the two heroes, have an air of grandeur, and inspire me with an awe and respect which I cannot describe."

Could I have supposed that any one visiting Delhi, would not have this account fresh in memory, I would earlier have troubled you with the reference.

Regarding Chittore, Ferishta says that when Akbar was besieging Chittore, after the failure of two assaults, the emperor was so fortunate as to shoot Jugmull, whom he had observed on the ramparts directing the defence. On which the enemy lost heart, destroyed their wives and children with fire, on a funeral pile with their slain chief, and retiring to their temples refused quarter, but were slain, (apparently without resistance,) to the number of ten thousand. This Jugmull must be the same as the Jemel of Bernier.

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The Hindoo account as collected by Tod from the records and traditions of Mewar is as follows.

"But the names that shine brightest in this gloomy page of the annals of Mewar, which are still held sacred by the Bard and true Rajpootre and immortalised by Akbar's own pen, are Jeimul of Bednore and Putta of Kailwa, both of the sixteen superior vassals of Mewar. The names of Jeimul and Putta are as household words inseparable, &c. When Saloombra fell at the gate of the Sun, the command devolved upon Putta of Kailwa. He was only sixteen years of age. His father had fallen in the last shock, and his mother had survived but to rear this the sole heir of their house. Like the Spartan mother of old, she commanded him to put on the saffron robe and to die for Chittore. But, surpassing the Grecian dame, she illustrated her precept by example, armed the young bride of her son with a lance and with her descended from Chittore; whence the defenders saw the young bride fall fighting by the side of her Amazonian mother. When wives and daughters performed such deeds, the Rajpootees became reckless of life. They had maintained a protracted defence and had no thought of surrender, when a ball struck Jeimul who had succeeded to the command."

The northern ramparts had been entirely destroyed by the mines of Akbar. The fatal Johur or sacrifice of females was awaited, and at its close, the gates of the fortress were thrown open, the work of destruction commenced, and few survived to stain the yellow mantle by inglorious surrender. Akbar entered Chittore and slew 30,000 of his enemies. Nine queens, five princesses, their daughters, with two infant princes, and the families of all the chieftains not at their estates, perished in the fatal Johur or in the sack. The gates were taken for the emperor's fortress at Agra.

Akbar claimed the honour of Jeimul's death by his own hand. The conqueror of Chittore evinced the sense of the merits of his foes in erecting statues to the manes of Putta and Jeimul at the most conspicuous entrance of his palace at Delhi.

I have shortened and simplified Tod's inflated narrative which is often sufficiently obscure.

The origin of these statues is still matter of uncertainty. Had they been made by Akbar or carried from Chittore by him, we might expect to find them rather at Agra, his chief capital, than at Delhi.

The stone of which the elephants are built is of black colour and slaty texture, greatly resembling that of which the Indo-Greek sculptures are wrought near the Indus. There is nothing of this kind at or near Delhi; nor do I think it is found at Chittore: but of this I am not certain. Being in blocks of moderate size it may have been brought from afar. The statues stood at the gate of the citadel of Delhi at the commencement of Aurungzebe's reign. When that monster's religious frenzy attained its height, they were probably pulled to pieces, in deference to the hatred of the orthodox for images of all kinds. Bernier states, *not* (as quoted by Tod), that they stood at the *principal* entrance to the citadel, but that they stood at *one* of the principal entrances. This was probably the Delhi gate of the citadel; so called as facing the original city of Delhi. They were found buried in old and in recent rubbish, inside the citadel, at a spot intermediate between the two principal gates, but nearer to the Delhi Gate.

The screens to the citadel gates were built by Aurungzebe himself, and they could not perhaps have been built without removing these statues, which at any rate would be most suitably posted outside the gate of the screen. Supposing them to have been pulled down accordingly, it is not to be supposed that the saintly monster would have had any share in reconstructing idols.

P. S.—In Tod's narrative we are told that there were 30,000 inhabitants in the fortress of Chittore when it opened its gates. Yet he does not say that these rushed out sword in hand upon the enemy. And from Ferishta's account we gather that they could have made little or no defence, as few if any of the assailants were slain. The spirit of manhood seems to have deserted the breasts of the males to centre in that of the women. Indeed the brutal sacrifice of the Johur whilst 30,000 of the garrison survived, or even the ten thousand reckoned by Tod, denotes anything but the spirit of heroes. Undoubted instances of the gallantry of Rajpootres are on record. But they seem at times to have despaired very early in the day. Certainly no army of undisciplined troops could have taken Chittore if manfully defended by ten thousand men.

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Observations on the Geological features &c. of the Country in the neighbourhood of Bunnoo and the Sanatorium of Shaikh Boodeen.

—*By* C. P. Costello, Esq., *Asst. Surgeon, 6th Punjab Infantry.*

Communicated by the Punjab Auxiliary Committee of the Asiatic Society.
[*Received 16th February*, 1864.]

The Bunnoo Valley is surrounded by hills on every side—on the north by the hills of the Caubul Kheye Wuzeerees which are a continuation of the Sooliman range, on the south by the Batannee range: on the east by the Khattuck hills; and on the west by the Sooliman range. I am not possessed of any geological information regarding the Caubul Kheye hills. The Batannee hills strike off at an acute angle from the Sooliman range on the west, proceed at first in a south-easterly direction until they reach Peyzoo; and then run eastwards across the Murwut Valley; and terminate by sloping off towards the Indus at the junction of this river with the Koorum below Esan Kheyl. The portion of the range next to the Sooliman hills is called the Peyzoo hills, which terminate at Peyzoo. The next portion is called Shaikh Boodeen, which is about 6 miles in length, and terminates in sand [sandstone ?] hills (the highest of which is about 1200 feet above the plain below,) which form the termination of the whole range.

The Peyzoo hills are irregular, wavy, sand [sandstone ?] hills with two passes through them—the first, next the Sooliman range, being called the Baenderra; the second the Peyzoo pass. I have not obtained any fossils from these hills. Each pass is intersected by numerous nullahs.

Shaikh Boodeen is about 4,500 feet above the level of the sea; and the little hill station on its summit is the frontier Sanatorium. The general dip of the strata is towards the north, and their strike from east to west. The angle which the dip forms with the horizon is a good deal more than a right angle. The upper portion of the hills is composed chiefly of limestone, which very often is stained red and yellow by peroxide and bisulphuret [?] of Iron. Lower down the hill, there is more claystone mixed with blocks of limestone; and at the foot of the hill, we meet with the low sand [sandstone ?] hills continued from the Peyzoo range. This lowermost portion of the hill, is in many places covered with the *debris* of the higher parts, in the form of broken rocks

and lime mixed with sulphur [?]; this is most remarkable on the Agsun* Kheyl side. The limestone above-mentioned affords very good quick lime for building; and the stone itself is also very useful for the same purpose. The water found in springs at the foot of the hill has a strong chalybeate taste. Hitherto no springs of any consequence have been discovered on the hill higher up; but search is being made for them. The principal fossils (shells) found about the summit of the hill are Belemnites, Cardiums, Echini, and Pectens; also Turrilites, one or two specimens being in Capt. Urmston's collection which he has formed at Lahore.

This portion of the hill would therefore seem to belong to the "Upper Chalk."

On the very lowermost portion of the southern face, I have found a few specimens of a *Pecten* resembling the *Pecten Jacobæus*. The next portion of this range† is composed of sandstone hills, which are disposed in parallel ridges running from north to south. The highest ridge is about the centre of this portion of the range, the ridges on each side sloping off, on one side, towards Shaikh Boodeen, and on the other towards the Indus. From these hills, I have obtained portions of heads, teeth, tusks, vertebræ, and limbs of Mammalian animals. Amongst these, I may mention the head and teeth of the Mammoth and other species of Elephant. I have forwarded a number of these to the Lahore Exhibition; and as they are afterwards to be made over to Captain Stubbs, Offg. Sec., Punjaub Auxiliary Committee of the Asiatic Society of Bengal, I don't wish to make any special reference to any of them, until I know how far I have been correct in naming them. This terminal portion of the Batannee hills would, (on account of the occurrence in them of fossil species of the Elephant seem to belong to the Tertiary formation.

I don't know anything about the Khattuck hills. All I know of the Sooliman hills, is that the Wuzeeres find quantities of lignite and pyrites in them.

The Bunnoo Valley appears to be composed of modern alluvium. I have observed several vertical sections of the soil—some of them being from 20 to 40 feet in depth. In all cases, the sections have been formed of alternate layers of sand and conglomerate; most of the stones

* The northern side.
† Batannee.

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in the conglomerate being rounded. In these layers species of Paludina, Planorbis, Limnea, &c. are found. The Koorum river enters the valley at its northern extremity through the Caubul Kheyl Wuzeeree hills; the Gombelah through the same hills, but more to the west. The latter unites with the former below Lukkie, and the Koorum thus enlarged, finally empties itself into the Indus below Esau Kheyl. It is not improbable, that the Bunnoo Valley was once a lake; and that the two rivers were the feeders of this lake; which probably, finally became emptied by the water gradually cutting its way through the pass in the Khattuck hills, through which the Koorum *now* runs to join the Indus. Between the southern face of the sandstone hills, (to the east of Shaikh Boodeen), and the Indus is another range called the Betote range; and the intervening valley is called the Lâgee Valley, at the mouth of which is the village of Punnialla.

This Betote range appears to be of the same composition as Shaikh Boodeen; at its upper portion at all events. From this upper portion, good limestone is also procured, and fossils of the same kind as on the upper portions of Shaikh Boodeen are I believe, found on it. From the middle and lower portions the following fossil shells have been procured —a good number by myself:—*Inoceramus sulcatus*, *Lima Cardiiformis*, *Producta horrida*, *Producta semireticulata*, *Spirifer striata*, *Calceola sandalina*, *Uncites gryphus;* and fossil Corals—*Syringopora ramulosa*, and *Lithodendron irregulare.** These fossils with some others, are among those which will be made over to Captain Stubbs, R. H. A.

* The author is responsible for these and other identifications.—Eds.

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Extract from Report of the Operations of the Great Trigonometrical Survey of India during the year 1862-63.—*By Major* J. T. Walker, R. E. *Superintendent G. T. Survey.*

[*Received* 10*th November*, 1863.]

In accordance with the sanction of Government, I proceeded, in the autumn of 1862, with the officers and assistants marginally detailed,* to Vizagapatam to measure a Base Line. Vizagapatam is situated nearly on the same parallel of latitude as Bombay; and is the point where the Bombay Longitudinal Series, when extended eastwards to the Madras Coast, will terminate. This series of triangles will form, with the Great Arc Meridional, the Calcutta Longitudinal, and the Coast Series, a vast quadrilateral figure, circumscribing the Meridional Series of triangles which are required as a basis for the interior topographical details. Base Lines had been measured several years ago, by Colonel Everest, at Beder, Seronj, and Calcutta, the S. W., N. W., and N. E. angles of this quadrilateral. One more Base Line remained to be measured, which, for considerations of symmetry, it was desirable to place in the vicinity of Vizagapatam.

Captain Basevi, the officer in charge of the Coast Series, being located at Vizagapatam, was directed to select the site. After several trials, owing to the difficulty of carrying a straight line, several miles in length, so as to avoid the numerous irrigation tanks with which this district is studded, he eventually succeeded in finding a suitable line, on the undulating plain between the Military stations of Vizagapatam and Vizianagram, at a distance of about fifteen miles to the west of the port of Bimlipatam. The ground was chosen before the commencement of the rainy season of 1862, when trenches were dug to carry away the expected rain fall during the monsoon, and every precaution was taken to keep the line dry. But when Captain Basevi took the field early in October, he found that the rains had been so heavy, that the surrounding tanks had been converted into lakes, and the line lay submerged under a sheet of water, in some parts as much as sixteen feet deep. By great exertions the water was drained off into adjoining ravines. A portion of the line was ready for measuring on my arrival in December, and the remainder had become fairly dried by the time it was reached, in the course of measurement.

* Messrs. Hennessy, Taylor, Campbell, Wood, Burt and Mitchell.

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The apparatus employed, consisted of a set of Compensating Bars and Microscopes, on the principle of those designed by Colonel Colby, for the Ordnance Survey of Great Britain, which had been constructed under the superintendence of Colonel Everest, by whom they were brought out to India in 1832. This apparatus has been employed in measuring three Base Lines on the Great Arc, two at the north and south extremities of the Calcutta Meridional Series, and two at the extremities of the Indus Series. The length of these bases has, in each instance, been determined in terms of ten foot Standard Bar A, the unit of measure of the Indian Survey.

At the time this Standard was constructed, it was believed that the length of a well made iron bar, supported by rollers at its points of least flexure, might be considered invariable for any given temperature. But, of recent years, there has been a growing tendency to doubt the invariability which has hitherto been assumed. Series of comparisons made by the Ordnance Survey show there is much probability that the texture of an iron bar changes gradually in the course of years; for the factors of expansion obtained from groups of comparisons made at intervals a few years apart, differ from each other by larger quantities than are due to errors of observation. It is preferable, therefore, to employ several Standards, constructed of different metals, rather than to trust to the integrity of a single bar.

To ascertain whether our Standard has altered in length, it would be necessary to remeasure the whole, or part, of one of the Base Lines which were first measured after the arrival of the Bar from England. I wished to obtain some light on this subject, by remeasuring certain short sections of the Calcutta Base Line, the extremities of which were originally indicated by permanent marks. But, on examining the positions of the section markstones, I found that, though concealed from view, there had been a regular thoroughfare over them, for many years, of carts and elephants, as well as foot passengers; consequently, they must, in all probability, have been disturbed, and they cannot be safely referred to, to decide so delicate a matter as the constancy of the Standard.

Disappointed at being baffled in my efforts to investigate this matter by any simpler and shorter process than the remeasurement of a whole Base Line, I determined to mark the intermediate section stations of the Vizagapatam Base as permanently as the extremities,

in order that any future enquiry regarding the length of the Standard, at the time of the measurement of this Base Line, may be conducted without greater labour than the measurement of a short section.

It has been well said, by one of the greatest living authorities on scientific matters, that "the ends of a base line should be guarded with religious veneration." In this country they are liable to be viewed with mingled cupidity and dread; the natives sometimes fancy that money is buried below, or they superstitiously fear that the Englishman's mark will cast a spell over the surrounding district. In either case, the mark is liable to be destroyed, as has already happened at the Seronj Base Line.* To ensure the protection of the ends of the Vizagapatam Base, I have had substantial domes of cut stone masonry built over them, without any openings, so that, before the marks can be reached, the domes must be pulled down, which will be so laborious, that the Police should be able to hear of and arrest the perpetrators, before they have had time to harm the marks.

Captain Basevi, and the Assistants of the Coast Series Party, shared in the measurement of the Base Line, which occupied about two months. The length of the line is six and a half miles. It was divided into three verificatory sections, which were subsequently checked by two series of triangles, one on each flank of the base, to test the measure of each section against the others. These tests were satisfactory; for the extreme difference between the measured length of the whole base, and its computed length by triangulation from either section, has been found to be one inch. The comparison of the measured length, with the computed value brought down by triangulation from the Calcutta Base Line, is singularly satisfactory, for the error of the computed value is only a quarter of an inch, though the triangulation embraces a distance of four hundred and eighty miles,

* On this subject, the following extract is taken from a letter by Colonel Sir George Everest, C. B., to the President and Council of the Royal Society, dated 8th April, 1861:—

"The natives of India have a habit, peculiar to human beings in that state of society, of attributing supernatural and miraculous powers to our instruments, and the sites which have been occupied by them. In cases of death, or any other natural visitations, they often offer up prayers to those sites, and if the object of their prayers be not conceded, they proceed to all sorts of acts of destruction and indignity towards them; nay, as in all cases where it was practicable, my station marks were engraved on the solid rock *in situ*, they have been known to proceed in bodies, armed with heavy sledge hammers, and beat out every vestige of the engraving."

much of it passing over flat plains, which are covered with dense forest and jungle, and very difficult to work through.

On the completion of the Base Line, Captain Branfill was deputed to connect it with the principal triangles of the Coast Series, and to execute the verificatory triangulation between the sections. Meanwhile, Captain Basevi proceeded, by my instructions, to make a reconnoisance of the neighbouring territories of the Rajah of Jeypore.

It is a singular fact that, in the vicinity of the British stations of Vizagapatam and Vizianagram, and within sixty miles of a coast which has been frequented by British traders for upwards of a century, there is an extensive tract of country, subject to a friendly Rajah, of which less is known, than of districts occupied by hostile tribes, along the frontier of our recently acquired Punjab Provinces. A glance at any map of the Madras Presidency reveals a great blank in our geographical knowledge, in the tract of country which lies parallel to the coast, and North-East of the Godavery river. Its deadly reputation appears to have been a bar alike to the explorations of the curious and scientific, and to the visits of sportsmen. No regular survey of it has ever been attempted; the few places given in the map seem to have been obtained from native information, for they are generally exceedingly erroneous.

A reconnoisance of this tract was required for our own operations, in the extension of the Bombay Longitudinal Series to Vizagapatam. As any reliable information regarding lands so little known might be expected to be of much value and general interest, I was much gratified when Captain Basevi volunteered to reconnoitre this *terra incognita;* though, at the same time, I could not but feel apprehensive for his safety in a country so deadly, for his route would have to pass through dense jungle, in which it would be necessary for him to preserve his reckoning by the troublesome process of traversing; which, under such circumstances, is very laborious, and entails the necessity of performing the greater part of each day's march on foot. The inevitable exposure to be thus undergone is very great, in a tropical climate, and when the district to be traversed is known to be exceedingly feverish and unhealthy, no small amount of courage is needed, to prompt a man to volunteer for such a task.

Captain Basevi took with him one European Assistant, Mr. O'Neill, and a few natives. He, himself, fortunately escaped with a

slight attack of fever, but Mr. O'Neill suffered severely, and has not yet recovered, and the natives of the party were also, more or less, incapacitated by fever, so that but for the assistance afforded by the Rajah of Jeypore, the operations would have been stopped almost at their very commencement. The results are, a good preliminary map of Jeypore, which has been forwarded to the Surveyor General, to be lithographed and published; a report by Captain Basevi, giving details of his route, and a general description of the country; several valuable astronomical determinations of latitudes and longitudes, and barometrical determinations of heights; also memoranda of various other routes, the details of which were obtained from native information. In consideration of the great value of Captain Basevi's services, he has been permitted to proceed to Europe on furlough for one year, during which his appointment will be kept open for him.

During the summer of 1862, the Field Season of the Kashmir Survey Party, the triangulation made great progress to the east of Leh, and stations were fixed on the Chinese Frontier, from which a number of peaks in Tartary were determined. Some of these were more than one hundred miles distant, and will materially aid in the construction, from native information, of maps of districts into which the surveyors will probably be unable to penetrate. Several of the stations observed from were over 20,000 feet in height above the sea, and Mr. Johnson visited one peak of a height of no less than 21,072 feet, but, owing to a very heavy fall of snow, was unable to observe from it.

A great many points were fixed in the Pangkong district. The whole of Astor was triangulated, aad several peaks were fixed to the north of Gilgit; none of these were of any great height, the highest being only a little over 19,000 feet. The natural difficulties of the country were at first much enhanced by bad weather, which came on with the heavy rains in the southern and outer Himalayan Ranges. Notwithstanding these circumstances the out-turn of work has been good, and the general progress very satisfactory, the total area of the triangulation being about 10,500 square miles, and of topography 10,400 square miles, on the scale of four miles to the inch.

The topographical operations made good progress, though not so great as would have been the case had all the assistants retained

their health. Unfortunately two of them, on entering the higher ranges, broke down completely, and a third had to leave off work early in the season. The ground sketched was generally very elevated and barren, the Surveyor's chief difficulties arising from the want of provisions and firewood, and sometimes even of fresh water. The plane table sketches required for the map of Little Tibet have been completed, and lodged in the Head-Quarters Office at Dehra. A glacier, about twenty miles in length, was discovered by Mr. Ryall at the head of the Nubra Valley. Some large glaciers were also found in the neighbourhood of the Nanga Parbat.

I fully concur in the testimony which is borne by Captain Montgomerie, to the great zeal with which these arduous Survey operations have been carried on by all the assistants under his orders. The good fortune of success has hitherto attended all undertakings executed under the superintendence of this officer.

There is much reason to expect that, if the snows are not unusually heavy, and if most of the Surveyors keep in good health, the remainder of the country to be surveyed in and around Kashmir and Ladak, will be completed during the next field season. Captain Montgomerie has made every effort to persuade the Maharajah of Kashmir to allow one of our Surveyors to go to Gilgit, and has obtained a half promise to this effect. Possibly the fear of being called to account, should any harm happen to a European in his territories, causes the Maharajah to hesitate to sanction an undertaking which might be somewhat perilous. He informed Captain Montgomerie that, during the late winter, his troops in Gilgit had been sleeping; no exacter information could be elicited than what is suggested by this metaphor. If, as Captain Montgomerie thinks likely, the sleep was that which knows no waking, the Sikh garrison of the Maharajah must have been massacred by the hill tribes, in which case there is little hope of our Surveyors being soon able to penetrate into Gilgit.

The Eastern Frontier Party, under the charge of Mr. C. Lane, Chief Civil Assistant, has been employed, throughout the Field Season, in Independent Tipperah. At the end of the preceding season this triangulation had reached a point to the South of Cherra Poonjee, on the confines of Tipperah, where the British Boundary retrogrades Westward to a considerable distance, so that the triangulation would

have had to make an extensive circuit, in its onward progress to Chittagong, had the operations been required to be kept within the British Boundary. Fortunately, Mr. Buckland, the Commissioner of Chittagong, had sufficient influence with the Maharajah of Tipperah to induce him to consent to our operations being carried across his territory, on the direct line to Chittagong.

Mr. Lane proceeded, in the first instance, to Agartolla, the chief town of Tipperah, where the Maharajah resides; and there he succeeded in securing the friendship and good-will of the Prince and his Court to an extent to justify the expectation, which was subsequently realized, of obtaining their cordial assistance and co-operation. Mr. Lane deserves much credit for the tact he has displayed in cultivating amicable relations with the barbarous races that inhabit the hill country of Tipperah, who have long been a terror to the industrious population of the plains within the British Frontier. Mr. Lane has sent a valuable report on the portion of Independent Tipperah traversed by himself and Assistants during the past Field Season, from which extracts will be given in an appendix to this Report.*

* The duty of selecting stations for the Triangulation devolved on Mr. Rossenrode, than whom the party could not have had a better pioneer. The following simple narrative of his operations is extracted from his letters:—"When the Kookies were apprized of my arrival at Heara, they naturally concluded that I had come to apprehend and punish them for the robberies and murders they had perpetrated on our frontier. They hid themselves in the jungles, and left their villages. With much persuasion the Rajah's people brought them to my camp. They watched all my proceedings, and asked me no end of questions. I always keep a man near me to interpret, and I answer every question they put me; all seem satisfied with my answers, and the confidence I place in them. Of course my movements are slow, because my work has the greatest difficulties to contend with; the inhabitants must be conciliated, the site to be fixed upon must be traced and found, and cleared of jungle. To fix on sites at all in this dense and almost uninhabited forest, in which the sun can seldom be seen, is a feat any man may be proud of, especially when the inhabitants try to mislead. I hope to get on faster, when I divest the minds of these savages of all suspicion. I am all day long climbing or descending hills, or wading through water. Wild elephants and buffaloes are numerous, and may be come upon suddenly, when wading through the watercourses. Whenever you see a bamboo signal, avoid the direction it points to, because an unerring arrow is placed there, with a bow strong enough to give an elephant his death blow. The Kookies think of nothing but eating and drinking. Feeding them occasionally is a good plan, and they would become very much attached to you, and follow you like dogs, and, no doubt, prove faithful, and work well, if well fed. Last year I had to deal with the Nagas and Kookies of Cachar, as well as those on the Manipoor frontier. They are the same filthy, naked savages as their brethren in Independent Tipperah. They frequently enquired whether I knew of Captain Guthrie, who made the road from Cachar to Manipur, over the hills, and they said he was the best sahib they had ever met with, and gave them buffaloes, cows, pigs, and goats to eat daily, and grog to drink, so that, even now, they think of his feasts.

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The East Calcutta Longitudinal Series Party was formed on the 1st September, 1862, and placed under the charge of Lieutenant Thuillier. The object of this Series is to become the basis for the surveys of the districts of Nuddeah, Jessore, and on, *viâ* Dacca, to the Eastern Frontier, along a parallel of latitude slightly North of Calcutta. The publication of the sheets of the Indian Atlas, which embrace these districts, has long been delayed for want of this triangulation.

The party proceeded from Dehra Doon, by steamer and railway, to Calcutta, where they took the field in November, on the termination of the rainy season. Operations were commenced at Chinsurah, on a side of the Calcutta Meridional Series. Much assistance was derived from a carefully executed Map, prepared in the Surveyor General's office, by which Lieutenant Thuillier was enabled to lay out his lines so as to pass through a minimum amount of property. In working through forests and jungle, it is usual, in the first instance, to cut a narrow glade, in a perfectly straight line, through all intermediate obstacles, in the direction of the required station; when this

"I must notice one peculiarity among the Kookies. They all assemble from adjoining villages of the same tribe, and perform the work allotted to them, and share the hire. If you want twenty men from a village, and there are sixty in that village, all will come, whether you wish it or not. If they have to cut jungle, they will all do it; if they are to carry loads, they will divide the twenty loads into sixty, and each man will carry something. One man will never act as a guide, or do any work singly; he must have a companion, and both must be paid. I have tried to break through this habit, but have been told that, if all are not allowed to work, they will not come at all. One might suppose that sixty men would finish the work sooner than twenty, but this is not the case; they eat three times a day, will not begin work before nine, they work until twelve, and then walk off, without asking or telling anybody. They remain away two hours, cooking and eating, and then return and work till an hour before sunset. During the working hours, some are smoking, some making drinking mugs from the bamboo, and others amusing themselves; half are thus occupied, while the remainder are working, and then they change about, and those who are relieved smoke, making drinking mugs, walking sticks, or otherwise amuse themselves. The Rajah's agents have no control over them, and they do not always obey their own Sirdars.

"A Kossyah coolie is really worth four Kookies. When a Kossyah carries a light load, or is lazy, he is called a Kookie by his companions, which annoys him so that he will carry the heaviest load, or tuck up his sleeves, and work in right good earnest. I attribute the Kookie's want of energy and inability to carry loads to the excessive use of spirits, which are distilled in every hut, and partaken freely by every member of the family. There are many Chiefs among the Kookies in the Tipperah Raj. These are all called Rajahs; they have their Wuzeers, Nazirs, and Sirdars, and a number of servants of both sexes. The Kookies have no written language. The Rajahs never pay visits, even to the Maharajah, and their Wuzeers and Nazirs are sent to the Court only on very important occasions."

trial line has been carried over a distance of eight to ten miles, the ground beyond is carefully reconnoitered for a suitable site, to which a line is cut from a convenient point in the trial line; thus two sides and the included angle of a triangle are given, with which data it is easy to ascertain the direct line between the two stations, which is then cleared to obtain mutual visibility. Owing, however, to the valuable nature of the property through which the triangles were carried, it was necessary to run a traverse along each line, with numerous intermediate bends, to avoid houses and orchards. In clearing the final line, great caution was requisite to prevent any tree from being cut down needlessly, a matter of some importance in Bengal, where every tree is more or less valuable, and has to be paid for. These circumstances greatly increased the labour of the preliminary operations, and protracted them over a longer period than is usual.

Further delay was caused in building the principal stations. These are usually, towers, with a central pillar, four feet in diameter, of burnt brick and lime masonry, surrounded by a platform of unburnt bricks and mud, fourteen to sixteen feet square, the whole raised to a height of twenty to forty feet, according to the nature of the obstacles to be overlooked. This structure has been adopted on account of its cheapness, and the rapidity with which it can be constructed; it has hitherto been found to be well adapted for our requirements. But it appears to be inapplicable for the rainy and moist climate of Eastern Bengal, where unburnt bricks rarely have an opportunity of drying sufficiently to be safely used, in raising a structure of such necessarily large dimensions. At one of Lieutenant Thuillier's stations, in consequence of the employment of damp materials in the unburnt brick work, and constant and heavy falls of rain during the construction, the building gave way, under the weight of the instruments and observatory tent. Fortunately, the large Theodolite was packed in its case, and received no injury, but the season was too far advanced for the tower to be rebuilt before the setting in of the monsoon, and as the mishap occurred in the first polygon of the principal triangulation, and there were no more towers ready in advance, the out-turn of work, as measured by the area triangulated, is unusually small, though much valuable experience has been gained, and there is every reason to hope that there will be a full out-turn of work next season. The design of the tower stations will have to be altered to suit the climate

of Eastern Bengal; in lieu of the present solid mass of earthwork, it will be necessary to build a masonry wall around the central pillar, to support the observer's platform.

The Rahoon Meridional Series, under the superintendence of Mr. H. Keelan, First Assistant G. T. Survey, was brought to a termination during the last Field Season, by being extended southwards until it joined the Great Longitudinal Series of Triangles, connecting Calcutta and Karachi. The meridional distance triangulated is sixty-nine miles, by thirteen principal triangles, arranged in polygons, for mutual verification, and covering an area of 1,603 square miles.

This Series has taken six years to accomplish. It was commenced by Mr. Logan, late First Assistant G. T. Survey, but has been chiefly executed by Mr. Keelan. It is double throughout, the triangles being arranged in successive quadrilaterals and polygons of remarkable symmetry. Its meridional length is 457 miles; the principal and secondary triangles cover an area of 23,620 square miles. The computations and maps connected therewith will be completed by the 1st October, when the party will be transferred to the districts on the meridian of 84°, between Sumbulpoor and the East Coast. The total cost of the operations, up to 1st October, will be about Rupees 2,01,609, which gives a rate of Rupees 8-8-6, or about 17 shillings per square mile.

The field operations of the Gurhagurh Series, on the meridian of Umritsur, were brought to a termination at the end of season 1861-62, when it formed a junction with the series of triangles on the same meridian which had been brought up by Captain Rivers as far as Ajmere, from the Great Longitudinal Series. By the 1st October, 1862, the recess computations and charts were completed, and the party was available for transfer elsewhere. This Series has taken five years to complete; the greater portion has been executed by Mr. George Shelverton. Its meridional length is 557 miles; the area covered by the principal and secondary triangles, 19,096 square miles; the cost, Rupees 1,08,212, which gives a rate of Rupees 5-10-8, or about 11 shillings per square mile.

The Sutlej Series follows the left bank of the Sutlej from its junction with the Indus, near Mithunkote, to a side of the Gurhagurh Series near Ferozepoor. It was commenced towards the close of Field Season 1860-61 by Lieutenant Herschel, and was completed

last season by Mr. Shelverton. It is single throughout. The recess computations will be completed by 1st October, when the party will be transferred to the meridian of 80°, to execute the required triangulation between Jubbulpore and Madras. During the past Field Season the triangulation extended over a distance of 112 miles, covering an area of 1,366 square miles. A very creditable amount of secondary triangulation was also executed. The total cost of the Series, up to 1st October, the date of its completion, will be about Rupees 80,743; the total area covered by the trangulation is 8,142 square miles, thus giving a rate of Rupees 9-14-8, or nearly 20 shillings per mile.

The Bombay Party, under the superintendence of Captain Haig, Royal (Bombay) Engineers, having completed the triangulation in Northern Bombay, was deputed to execute a series of triangles to the south of the parallel of Bombay, on the meridian of Mangalore. While the preliminary operations and selection of stations were proceeding, Captain Haig marched to the origin of the Bombay Longitudinal Series, with a view to making this Series double throughout, by adding flank stations, so as to form polygons in parts where there were only single triangles. On reaching the ground, it was found that the ends of the Beder Base Line were, fortunately, in good preservation. Three of the advanced stations had, however, been completely destroyed. Captain Haig judiciously determined to triangulate the Series anew, as far west as the Mangalore meridian. The revision having been executed with a much superior instrument to that employed in the original triangulation, the value of this portion of the Bombay Longitudinal Series is very greatly enhanced.

Having completed this revision, Captain Haig was proceeding with the principal triangulation on the meridian of Mangalore, when an untoward accident brought his operations to an abrupt termination. The large Theodolite was set up for observation on the tower station of Palwan, when, without any previous warning, the tower gave way on one side, causing the fall of the instrument and observatory tent, whereby the instrument was so seriously injured that it is incapable of being again used, until it has been repaired by the makers in England. Fortunately, the horizontal circle, the most valuable portion, appears to have escaped injury, but the vertical circle was destroyed, and the injuries are such that the instrument cannot be repaired in this country. Captain Haig convened a Court of Enquiry to report

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on the circumstances; the proceedings of the Court have already been submitted to Government. The Court came to the opinion, in which I entirely concur, that the fall of the tower was occasioned by the sudden and unexpected sinking of the ground below, and that no blame is attributable to Captain Haig, or any other person, for the mishap.

Captain Haig had already turned out a very excellent season's work, comprising thirty-two principal triangles, covering an area of 6,625 square miles, and extending over a length of 260 miles, whereof 66 appertain to the Mangalore meridian, and 194 to the parallel of Bombay.

The Spirit-Levelling Operations were carried on by Mr. Donnelly, Civil Second Assistant, under the superintendence of Lieutenant Thuillier. The party accompanied me to Calcutta, to receive the necessary instructions regarding the programme of the season's operations, which could not be decided on until I had obtained reliable information regarding the Railway levels between Calcutta and Agra. I had hoped to be able to incorporate these into our work, so as to avoid the labour and expense of carrying a line of levels all that distance. During the previous Field Season, a connection had been made, at Agra, with the Railway levels brought up from Calcutta, and the Trigonometrical Survey levels, brought up from the mean sea level at Karachi. The two sets of results differed by about twenty-four feet, and it was hoped that all difference would disappear, on connecting the Railway datum, the site of Howrah Dock, with the mean sea level of the Bay of Bengal.

That level had already been closely ascertained, by a Series of Tidal Observations taken at Kydd's Dock, and subsequently verified by others taken at Kejiri, from the description of which (*vide* footnotes, next page,) it is evident that the mean sea level of the Bay of Bengal may be considered to be known to within a few inches of the truth. On connecting the Railway levels with Kydd's Dock, it was found that there still remained a difference of about twelve feet between the Railway and the Survey height of Agra. On discussing this subject with the Chief Engineer of the Railway, I ascertained that there were several breaks in the Railway levels, that, in consequence of the pressure of other work, there had been no opportunity of preparing a correct and true section of the whole line, and that it was contemplat-

ed to re-level the line, as soon as the Engineers had leisure to do so. I decided, therefore, on deputing the Levelling Party to re-level the line of the Railway, and connect all the Trigonometrical Stations within reach thereof.

Mr. Donnelly made good progress, and accomplished two hundred and forty-two miles of first-class levelling,* forty-one of which had to

* With an Assistant levelling the line, independently, behind him, station by station, after the method described in the published volume of Tables of Heights.

The following description of the connection of Kydd's Dock with the mean sea level of the Bay of Bengal is taken from a Report, dated 1st November, 1854, on the Calcutta Meridional Series, by Colonel Waugh, Surveyor-General, and Superintendent G. T. S. :—

"A Register of the Tides in the River Hoogly is regularly kept at Kydd's Dockyard, near Calcutta, the height of each successive tide being referred to a fixed datum line or zero, which is the bottom or sill stone of the dock, and therefore, an object of invariable character.

"A transcript of the Register of the Tides for two years viz.,—from May, 1846, to April, 1848, having been obtained from the Marine Department, a Monthly Abstract of Mean Tides was deduced therefrom.

"The waters of the ocean would maintain a constant level if undisturbed by the action of the Sun and Moon. La Place has demonstrated that this level is a mean between the highest and lowest state to which the surface of the ocean is reduced by the attraction of those bodies. This mathematical truth is corroborated by observations made on open coasts, from which it results that the mean of high and low water for two consecutive tides represents, very nearly, the level of the sea, and that the average for a lunation is constant within a very small quantity.—*Vide* Professor Whewell's Report, 7 vol., British Association's Report

"An examination of the Abstract of Monthly Mean Tides will, however, show that considerable irregularity exists in the River Hoogly, the monthly means differing as much as six and a-half feet. Now, if the annual average be considered as the true level of the sea, it would follow that for some months, consecutively, the mean height of the River is two and a-half feet below the sea level, a conclusion which is altogether inadmissible.

"The lowest monthly mean tide occurs about February and March, when the fresh water in the river is lowest, and strong Southerly winds do not prevail. The mean tide rises gradually, as the river rises during the South Monsoon until it attains its maximum in September or October, at which time the monthly mean exceeds that of February by no less than six feet. This rise is, obviously, the effect of accumulation, produced by inundation in the valley of the Ganges, and the force of the South-West wind, which dams up the freshes in the long and narrow channel of the river.

"It has been remarked by Colonel Cheape, Chief Engineer, in his Memoirs, dated April, 1825, that the surface of the Salt Water Lake, wherein the rise of the tide is almost imperceptible, would, on account of its wide expanse, represent very accurately the level of the sea with which it communicates. He also observes that Captain Taylor's levels indicate that the surface of the lake in the dry season, is 2*f.* 4·3*ins.* below the mean state of the river. This result corresponds very nearly with the mean tide of the river itself, which in February is 2*f.* 5*ins.* below the level of the annual mean.

"Colonel Cheape further states that the periodic rise of the surface of the lake in the wet season is ten inches. Now, the contemporaneous rise in the mean tide of the river has been shown to be six feet, and as the cause of these elevations is precisely the same, though the effects are in the ratio of seven to

be re-levelled, on account of large discrepancies which were found in the Railway levels. The operations had reached the vicinity of Bha-

one, the greater rise in the river can clearly be attributed only to the narrowness of its channel compared with the bay; it is probable that a considerable portion of the rise of ten inches in the surface of the lake is also due to accumulation; so that, although a rise may be supposed to take place in the level of the sea at the head of the bay, during the continued pressure of the S. W. Monsoon, still, that elevation must be much less than what takes place in the lake, where the effect of this rise is increased by the narrowness of the channel, and the influx of fresh water during the inundation.

"It has been shown that if the annual average of mean water be taken as the sea level, it would lead to the inadmissible conclusion that, in the dry season, the average level of the river at Calcutta is twenty-nine inches below the sea, with which it freely communicates. It has also been shewn that the surface of the Great Salt Water Lake, in the dry season, is on a level, or nearly so, with the mean tide of the river at the same time. It is likewise manifest that the periodic rise of mean tide during the monsoon, to the extent of six feet in the river and ten inches in the lake is occasioned by local causes, independent altogether of the true level of the sea, which is a constant level, and these causes, it appears, operating in narrow channels, are capable of producing exaggerated results in the proportion of seven to one, showing clearly the fact of accumulation. Hence the conclusion is inevitable, that the lowest monthly mean tide of the river, observed in February and March, represents the nearest approximation to the actual sea level, and that the rise of mean tide at Calcutta during other months, may fairly be ascribed to disturbing causes of an inland character, altogether independent of the true and constant level of the ocean. The variable character of the disturbing causes is shewn by the fact that the monthly means of corresponding months for the two years differ considerably, except in the months of February and March, the monthly mean tides of which are very accordant.

"Proceeding upon this principle, I have used the following observations to refer the datum line in Kydd's Dock to the sea level:—

"Mean Tide February, 1847, above datum, as measured on Guage, ...						8·11 feet.
"	March,	"	"	"	...	8·45 "
"	February,	1848,	"	"	...	8·48 "
"	March,	"	"	"	...	8·50 "
"	February,	1850,	"	"	...	8·28 "
"	March,	"	"	"	...	8·62 "
"	February,	1851,	"	"	...	7·94 "
"	March,	"	"	"	...	8·36 "
				Mean,	...	8·343 feet.

"Correction for Error of Graduation on Guage by Mr. Bedford's Measurements, ... 0·233 feet.

"By Tides measured at Calcutta in February and March, Mean Sea Level above datum, ... 8·576 feet.

"Again, in the years 1850 and 1851, Mr. Bedford, the Marine Surveyor, took a series of tidal observations at Kejiri, and connecting this point by a series of levels with Kydd's Dock, found that the datum line at the latter point is 9·07 feet below the sea level. Mr. Bedford's observations from which this result is derived, are as follows:—

	feet.	inches.
"Mean Height of Sea Level above the datum line at Kejiri, ...	8	9·75
"Datum Line at Kejiri above that of Kydd's Guage, ...	0	2·88
"Sea Level above the datum line of Kydd's Guage, ...	9	0·63

"Which reduced to decimals of a foot becomes, ... 9·053

gulpore, when Mr. Donnelly was compelled, by severe illness, to close work.

Mean Levels of the River's mouth at Kejiri, at Neap Tides, for the years 1850 *and* 1851, *excluding the South-West Monsoon.*

Months.	Highest Low Water.		Lowest High Water.		Mean.	
1850.	*Feet.*	*Ins.*	*Feet.*	*Ins.*	*Feet.*	*Ins.*
January,	5	0	11	9	8	4½
	4	0	11	9	7	10½
February,	5	6	11	0	8	3
	4	9	11	6	8	1½
March,	6	0	11	0	8	0
	4	9	12	0	8	4½
April,	6	9	11	0	8	10½
	4	9	12	6	8	7½
May,	6	9	12	0	9	4½
	5	3	13	0	9	1½
June,	6	6	13	3	9	10½
	6	0	14	9	10	4½
November,	7	0	12	3	9	7½
	4	9	13	0	8	10½
December,	5	9	11	9	8	9
	4	6	12	3	9	4½
1851.						
January,	4	6	11	9	8	1½
	4	3	11	0	7	7½
February,	4	3	11	3	7	9
	5	0	10	3	7	7½
March,	4	9	11	0	7	10½
	6	3	11	9	9	0
April,	5	3	12	9	9	0
	7	0	10	6	8	9
May,	5	6	12	9	9	1½
	7	0	12	6	9	9
June,	6	0	14	6	10	3
	6	9	13	3	10	0

During the year under review, I was called upon to collect all the available data of levels, existing in the Public Works, Railway, and

"Which differs from my determination by half a foot; but, if the tides at Kejiri for February and March be alone taken into account, at which period the inland waters flowing seaward are lowest, the result would agree with that derived from my discussion of the tides at Calcutta to about one inch."

Survey Offices, all over India, in order to reduce them to a common datum. As a first step towards this desirable measure, I have published a volume of Tables of Levels, based on the Spirit-Levelling Operations of this Survey, and reduced to the mean sea level of Karachi Harbour, as their datum. Additional volumes will be published as soon as possible. They will enable officers of the Public Works and Railway Departments to reduce their levels to the mean sea, by connecting them with the nearest Bench Mark, or Station, of the Trigonometrical Survey. In most instances, however, the business of connecting will probably devolve on the Survey Department. At present, we have only one Levelling Party, which is employed in Bengal; I therefore submitted a project for the formation of other parties to carry on operations, simultaneously, in the Madras and Bombay Presidencies, as the only means of speedily accomplishing an operation, of which the practical value will be greatly enhanced by early completion. Unfortunately, financial reasons have interfered to prevent this proposal from being sanctioned.

I now proceed to report on the Astronomical Observations for the determination of the Latitude and Longitude of the Andaman Islands, which were instituted on a representation by the Superintendent of Port Blair, that the erroneous positions assigned to some of these Islands, in the published Charts, endangered the safety of ships sailing between Calcutta and Singapore. Under the orders of Government, in the Home Department, the Surveyor General had deputed a Surveyor, Mr. Nicolson, to conduct the necessary observations, the superintendence of which was subsequently transferred to the Trigonometrical branch of the Survey.

Mr. Nicolson started from Calcutta early in December, 1861, to reconnoitre the Coco and Andaman Islands. He found that, in order to take a complete Series of Astronomical Observations at the Great Coco, it would be necessary to have a steamer placed at his disposal for some weeks, to keep up his communication with Port Blair, and bring the necessary supplies for his party.

About this time, a communication was received from the Bombay Government, representing that there was as much doubt about the accuracy of the position of Port Blair, as of that of the Coco Islands. Under these circumstances, it seemed advisable that Mr. Nicolson should begin operations by fixing Port Blair, in order that the proposed

operations might be commenced at the place where the greatest facilities for their execution existed.

The inaccuracy of the present Charts of the islands lying between Sumatra and Burma being admitted on all sides, it appeared necessary, in the absence of any regular survey of those islands, to fix, by astronomical observations, the positions of Acheen Head, Port Blair, the Great Coco, or the Preparis Island, and an island in each of the other groups, intermediate between Acheen Head and Cape Negrais. It is believed that the relative positions of the mutually visible islands of each group are already correctly shown on the Charts; consequently, by determining the absolute position of a point in each group, it would be possible to rectify the existing Charts, without making a general re-survey.

Mr. Nicolson, having completed his reconnoissance, returned to Calcutta in February, 1862, by which time one of the large 3-foot astronomical circles of the Trigonometrical Survey had been got ready, and a portable observatory, with rotating dome, constructed for the observations. There was no good astronomical telescope available in the stores of the Mathematical Instrument Department; consequently, Mr. Nicolson was directed to take all his observations, whether of occultations, eclipses, or moon culminations, with the telescope of the astronomical circle, which he could point to any part of the sky, through the aperture in the rotating dome of the observatory. Owing, however, to the small number of occultations and culminations which occur monthly, and the risk of losing some of them in cloudy weather, Mr. Nicolson was directed to base his observations for Longitude chiefly on the measurement of lunar zenith distances, for which the astronomical circle is well adapted. He was supplied with an astronomical clock, and all other necessary instruments, from the Calcutta Observatory.

In May, 1862, Mr. Nicolson had set up his observatory at Port Blair, and was ready to commence observations. Unfortunately, the season of fine weather had then nearly terminated; the Monsoon set in with unusual severity, nights favourable for observing were few and far between, and, consequently, several months elapsed before the whole of the necessary observations for Latitude and Longitude were completed. The work was further impeded by the delays attendant on postal communication between Calcutta and Port Blair, making it very

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difficult for me to exercise that degree of supervision over the operations, which their delicate and difficult nature required.

By the end of 1862, Mr. Nicolson reported that he had taken a sufficient number of observations to fix the position of Port Blair; he, therefore, applied for a vessel to be placed at his disposal to enable him to proceed to fix the positions of the Great Coco, and other islands. Owing to postal and other delays, it was not until the end of February, 1863, on my return from Vizagapatam, that I learnt from the Marine Department that no vessel was available, nor could one be got ready before the fine weather season would have terminated.

From the same communication I also learnt that the Secretary of State for India had ordered a complete Maritime Survey of the Andaman Islands to be executed. Being then in Calcutta, I went to Captain Rennie, the Secretary to Government of India, Marine Department, and was informed that, under instructions from the Admiralty Hydrographer, it had been determined to find the differences of Longitude between the various groups of islands, chronometrically, by a battery of thirteen or fourteen chronometers.

The circumstances under which it was originally proposed to fix a series of positions by astronomical observations had thus entirely altered. The complete Maritime Survey, which has been ordered by the Right Hon. the Secretary of State for India, renders further astronomical observations unnecessary. The determinations of differences of Longitude, which are the only really difficult portion of the work, can be done chronometrically by the Marine Surveyors, with much greater rapidity and economy, and, probably, even with greater accuracy, than by the best astronomical observations for absolute Longitude.

Consequently, in March last I desired Mr. Nicolson to restrict his operations to taking as many more observations for the determination of the Longitude of Port Blair as could be obtained before the setting in of the monsoon, and then to return to Calcutta. He reached the Presidency in June, and has ever since been employed in reducing his observations. They consist of 32 lunar culminations, 136 lunar zenith distances, 130 transits of clock stars, and 162 meridional zenith distances of stars for Latitude, observed up to the 12th March, when the astronomical clock met with an accident, and Mr. Nicolson was afterwards obliged to employ a chronometer. His subsequent observ-

ations are, consequently, not as valuable as the earlier ones; they consist of 9 culminations, 64 lunar zenith distances, and 36 clock stars. The whole of the Latitude observations have been reduced, and found exceedingly satisfactory. There has not yet been leisure to reduce more than a few of the observations for Longitude, but the results obtained hitherto are satisfactory. The final resulting Longitude will be communicated for publication in the *Calcutta Gazette* as soon as ascertained. It should serve as an excellent datum for the proposed Maritime Surveys, and save the expense of a series of voyages between Madras and Port Blair, which would otherwise have to be incurred to obtain a good chronometric determination of the Longitude of Port Blair.

[A tabular abstract statement of the field-work executed by each party during the official year 1862-3 is given on the next page.]

The Computing Officer has been employed in a variety of preliminary operations, which are necessary to form the basis of a general reduction of the whole of the principal triangulation of this Survey, which will shortly become necessary, now that almost the whole of the triangulation of the tracts of country comprised in the great quadrilateral figure connecting Calcutta, Karachi, Attok, and Purnea, is completed. Though the triangulation has been executed with the very best instruments, and though the system of observation which was introduced into this Department by Colonel Everest, is more rigorous and accurate than that of any European Survey, it is evident that, in consequence of the vast length of each Series, and the imperfections which necessarily attend whatever is the work of human hands, each Series generates a certain amount of error, which becomes apparent as linear error, on the termination of the Series on a measured base line, while on the close of a circuit formed by two Meridional Series, and the portions of the connecting Longitudinal Series at their extremities, it produces errors of Latitude, Longitude, and Azimuth. The dispersion of these errors in such a manner as to obtain the most probable results of the whole, giving its due weight to each fact of observation, and taking into consideration the bearing of every such fact on all the rest, is a matter of great intricacy and difficulty, on which it will be necessary for me to consult with the ablest mathematicians of the present day in Europe, before deciding on the system to be finally adopted. Meanwhile, the necessary preliminaries

The Out-turn of work executed by each party during the field operations of the official year 1862-63 is shown in the following Abstract :—

Statistics.	Kashmir Series.	Coast Series.	Sutlej Series.	East Calcutta Longitudal Series.	Rahoon Meridional Series.	Eastern Frontier Series.	Bombay Party.	Total Out-turn of Work.
Principal Triangles,	...	19	29	4	13	16	32	113
Average error of Principal Triangles in seconds,	...	0. 94	0″.43	0″.44	0″.46	0″.43	0″.89	0″.65 average.
Observed Azimuths,	...	1	1	..	2	...	1	5
Secondary Triangles with all 3 Angles observed,	...	10	132	...	16	...	32	190
Area of Principal Triangulation, square miles,	..	256	1366	220	1603	884	6625	10,954
„ Secondary Triangulation,	10,500	...	4816	...	950	263	1510	18,139
„ Topegraphically Surveyed, scale 4 miles = 1 inch, square miles,	10,400	...	...	...	...	...	...	10,400
Intersected Points,	...	12	112	...	18	22	110	274
Length of Principal Triangulation in miles,	...	...	112	20	69	49	260	490
„ Secondary ditto,	...	...	340	...	72	...	100	512
Miles of Rays cleared between Principal Stations,	...	...	300	253	159	...	...	712
Towers built for Principal Stations,	...	...	11	5	5	..	2	23
Platforms ditto,	...	12	...	...	6	17	44	79
Platforms built for Secondary Stations,	...	...	95	...	...	...	...	95
Length of Triangulation laid out in advance in miles,	...	...	...	45	...	77	150	272
Principal Stations selected in advance,	...	...	...	8	...	17	36	61

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for the eventual calculations are being carefully elaborated by Lieutenant Herschel, to whom I am indebted for numerous very valuable suggestions, and for co-operation as cordial as it has been unintermittent.

While the practical operations of this department may be confidently pronounced to be of a superior order to similar operations in any other part of the globe, it must, on the other hand, be admitted, that the theoretical applications, for the reduction of the triangulation, have not kept pace with recent improvements in geodetical science, which have been introduced into some European Surveys. The method which has hitherto been employed for reducing the observed angles, so as to satisfy all the equations of condition of each figure, though a great improvement on any previous method, has had, in its turn, to give way to the subsequently discovered method of minimum squares. The algebraical solution of the equations necessary to satisfy the condition that the sum of the squares of the errors shall be a minimum, is by no means difficult, but hitherto there has been no practical adaptation of it in this Survey, chiefly owing to the pressure of other and more urgent business, on those alone capable of dealing with the subject. Much progress has, however, been recently made in this direction, and I am indebted to Lieutenant Herschel for devising methods of calculation, which will enable the reduction of our figures to be effected, according to the new and rigorous system, by native computers possessing little more than a knowledge of arithmetic, with even greater facility than the less refined methods of reduction, which have hitherto been employed.

The drawing office has been chiefly employed in compiling maps of the dominions subject to the Maharajah of Kashmir, from the plane table sheets sent in by Captain Montgomerie. A new Chart of the Triangulation of this Survey, up to date, has also been prepared, and a Chart to illustrate the volume of Tables of Heights recently published; both these Charts were lithographed in the office of the Surveyor General, Calcutta. Nine original preliminary Charts of the triangulation, in various parts of India, have been prepared, in duplicate, for the use of the Surveyor General's Office, and the Geographer to the Right Hon. the Secretary of State for India. The Photographic apparatus is also being usefully employed in copying and reducing maps, and in furnishing preliminary copies for current use, until the

originals are engraved and published. Owing, however, to the small establishments at my disposal, the photography is necessarily restricted to the short period of the recess of the Kashmir Party, three to four months, when the services of our best photographer, Captain Melville, are available for their management.

In the Instrumental Department, great advantages may be expected by the appointment recently made by the Right Hon. the Secretary of State for India, of an officer, Colonel Strange, to superintend the construction of the new great Theodolite, and various astronomical instruments, which are being prepared in England for this department. When they are received in India, we shall be in a position to undertake the necessary operations for ascertaining our Longitudes, in connection with the Observatory at Greenwich, by means of the Electric Telegraph, which is now brought across from the Mediterranean to India.

On the Antiquities of Guzerat.—By Captain H. Mackenzie.

(Communicated by the Punjab Auxiliary Committee of the Asiatic Society.)

[*Received* 16*th February*, 1864.]

Guzerat City and Fort.—There are few antiquities in this district and of these few, little is known. Guzerat itself is considered to be of great antiquity: a town had existed here in former ages. I have not heard of any antique coins having been found in Guzerat itself, by which any perfectly trustworthy dates might be fixed, but there seems no reason to doubt that it was a place of some importance prior to Greek invasion. A Hindoo Raja named Raja Buchanpal, a Soorujbunsee, who emigrated from the lower Gangetic Doab to the Punjab, is said to have first built a city here, and called it Oodanuggree, the Everlasting or Sweet Smelling City. It is not known when this city ceased to exist, but it is recorded that in Sumbut 175 or 1740 years ago, Ranee Guzran, wife of Raja Budr Sain, (son of Raja Risaloo of Sealkote) rebuilt the city, and called it Guzran Nuggree. This too passed away. In Sumbut 1350, Sultan Mahmud Guzniwalla laid it waste, and it seems to have remained so until 285 years afterwards, when the Emperor Akbur Shah chose the ancient mound as the site for a stronghold.

The year 996 Hijree, A. D. 1580, is fixed upon as the date of its erection. It seems not improbable that the Emperor Shere Shah may have had a hand in it at an early period; for, after building the fortress of Rhotas, he is reported to have taken much pains to settle this part of the country, so long disturbed by the contumacy of the Ghukkers. In those days there was no stronghold in the Ghuj Doab to mark the Imperial power, and it was the high road between Dehli and Cabul. Thus the position as well as the features of the locality were favourable. The Emperor therefore decided to build a fortress on the present site of Guzerat. The story goes on to say that according to the old Asiatic principle "*Minuk az Sirkar*," "*Arud az Bazar*," the Emperor proposed that the inhabitants of the country should bear half the expense. But the Jats, in whose section of the Doab it was situated, objected, and the Emperor was obliged to turn for assistance to the Goojurs who inhabited the neighbouring country to the west. The sum required was one lakh and a quarter, but the idea of having a Goojur Fort in the country of the Jats was so tempting, that the Goojurs agreed to raise the money. Futty Mahomed Chondra of Varaichanwalla, a village near Dingah, took the lead in the matter, but the cash was advanced by Adum, a wealthy Goojur of Dingah. This man, however, was so *unlettered* that he could only give the cash by measure, and he accordingly meted it out in a *Tossa* measure. His descendants are known to this day, as the Tossa division of Goojurs and the names of the villages they own and inhabit, all have the prefix of Tossa, thus Tossa Oosman, Tossa Adum, &c. &c.

The fort was thus built with the assistance of the Goojurs and called conjointly after them and the Emperor "Goojerat Akberabad." This so vexed the Jats that they soon after sent a deputation to the Emperor at Dehli, and tried to induce him to change the name. But the Emperor refused to do so, and only consented to mark off their country as a separate Turuf with any name the Jats might choose to give it. They chose the name of Herat, from the Persian province of that name being their real or supposed place of origin. The upper part of the Doab was therefore henceforth divided into the two Turufs; Herat of the Jats and Goojerat of the Goojurs, either of which will be found specified in almost all old documents concerning lands and the rights thereto.

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The fort of those days is now hardly traceable, for it was renewed on a large scale in the early days of Sikh rule, by Sirdar Goojur Singh. The usual Imperial adjuncts, however, of a Baolee, Musjid and Hummaam, or at least the first and last, still exist and are in use at the present time. The fort is now much hemmed in by houses and streets. Its walls are 20 to 35 feet in height; it has only two entrances, and would still prove a considerable defence against an unscientific enemy.

The place grew in importance as time went on, but chiefly during the reign of the Emperor Shah Jehan. It then happened that a Pír of great virtue and sanctity, named Shah Dowla, took up his residence here. As the offerings made to him were large, so was his expenditure lavish, and a good deal was laid out on the improvement of the town and suburbs. There are yet to be seen the remains of a viaduct built of brick arches, and which seem to have extended from the north to the north east of the city, but whose use is not very apparent.

Hailan.—There are some extensive, and as reputed, very old ruins at Hailan, but nothing is known to determine their former history with any exactness. Some coins have been picked up among the ruins bearing the date of the 8th century Hijree, but nothing earlier than the Mahomedan times has been discovered. There is a large tomb still in very good order. Slabs are let into the walls bearing inscriptions. It appears to be the Tomb of Mirza Shaik Ullee Beg, an Ameer of the Emperor Akbur, who was killed in an encounter with the Ghukkurs; it is dated 999 Hijree. He founded a village close to Hailan, still called after him, Shaikh Ulleepoor, and possessed by his Mogul descendants.

Patu Kothee.—This is a very old ruin situated on the banks of the Jaba Nullah, at the foot of the Pubbee in Zail *Kurriahe.* The natives can give no information of its origin or use. It is of no great extent, but is reputed to be part of an old, perhaps buried city; the bricks are of a large model, one foot square and three inches thick, such as are never found in buildings posterior to Mahomedan rule, and very finely burnt; unfortunately no researches hitherto have succeeded in finding inscriptions of any kind. The bricks have often a mark in them as if described with the finger round the thumb as a pivot.

Russool.—Russool presents some vestiges of antiquity. An old mosque here contained an inscription commemorating its erection. The date was read as 1000 Hijree or thereabouts. It was placed in the Crystal Palace by Mr. Edward Clive Bayley.

Islamghur.—Islamghur is on a very high and imposing mound, which must be very ancient. It is said to have been the head quarters of the large chourassee of villages belonging to the Varaich Jats; in later times it was converted into a stronghold. The chief Chowdrees of the Varaiches have their residence and possessions in Jelalpoor to which Islamghur is close, but the latter is situated within the limits of the adjacent village of Koolachour.

Moong.—Moong is a very old place, it is very prolific in coins of later Indo-Greek kings, Azas, and the great (nameless) saviour king of kings, particularly small copper coins.

Khawaspore Serai.—The route to Cabul through the district has still the remains of the Serais and Baolees erected by the Mahomedan Emperors. The Serai at Khawaspoor was built by Suku Khawas Khan in the year 952 Hijree. Khawas Khan was a man of power in the service of the Emperors Shere Shah and his son Selim Shah. His mother was a slave girl in the former Emperor's seraglio, and he himself was married by the Emperor to the daughter of a Ghukkur chief, and deputed to govern this part of the empire. He immortalized his later master by converting the Bhutiaras of the Serai, and dubbing them Suleem Shahees or Islamshahees, which appellation the Maachus of the village and its neighbourhood give to their caste to the present day.

At Kharian there are two very large Baolees. Both are said to have been built at the same time, and their very different appearances now, are accounted for by the western one having been very thoroughly repaired by Sirdar Lena Singh. The eastern Baolee is in its original state, built of stones now very much worn; over the top of the steps is a massive dome with an inscription. It simply records the completion of the work in the month of Ramzan 1013 Hijree, in the reign of Akbar, who ordered it to be built by Jutyoollah son of Hajee Habeeboollah, and that it cost 11,000 Akburee Rupees, and it concludes with a prayer that the maker's sins be forgiven. Kharian bears the prefix of a Serai, but it does not appear that a Serai was ever

built here. It was a staging-place and the Baolees were provided but no Serai.

Serai Alumgeer.—The Serai at Nourungabad was built by the Emperor Aurungzebe, who gave his title of Alumgeer to it. It is improperly called the Serai of Nourungabad which is a village half a mile distant, and altogether out of the Alumgeer lands, which were granted to certain Khutrees to preserve the Serai. But during the Sikh rule there was a cantonment at Nourungabad which properly accounts for the Serai becoming known by that name also.

Chowkundee and Alumgheer.—Besides the above there are no relics of the Imperial sway, except the ruins of a hunting residence near Alumgheer in the upper part of the district. The ruined edifice still goes by the old Sanscrit derived name of Chowkundee. It was built by the Emperor Akbur Shah, in the 34th year of his reign, and was the first halting-place after crossing the Chenab, in the royal progresses from Dehli to Cashmere.

These Serais have long ceased to serve their purposes. After the decay of the empire, their utility was no longer appreciated: the materials were, to a large extent, appropriated to other purposes, and now the walls or their foundations only can be traced through the mass of plebeian habitations which cover their sites, but their remains attest their substantial construction and are still monuments of a large-handed wisdom and public beneficence, which found no imitators in the Sikh or Duranee governments which succeeded.

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Memorandum on the Question of British Trade with Western China viâ Burmah.—By Dr. C. Williams.

[*Received 24th June*, 1864.] [*Read 7th September*, 1864.]

The subject appears to naturally divide itself into the consideration of several sets of circumstances that may be conveniently classified under the following heads:

1st. The political state of the several countries between the Bay of Bengal and Central China;

2nd. The Physical Geography of the district proposed to be traversed by the various lines of communication;

3rd. Their commercial condition and capabilities including population, products, former and existing trade, &c.;

4th. The conclusion from consideration of the above three subjects, as to which is the most desirable and practicable route.

I.—Political.

Pegu, Martaban and Tenasserim, with their rivers and ports, being permanent portions of British territory, and all therefore but insuperable physical obstacles, being under the direct control of the British authorities, it is needless to consider their political condition.

The state of the political relations of Burmah Proper with the British Government of India, up to the end of 1862, has, I believe, had much to do with the direction which public attention has taken in looking for the desired opening of Western China.

Up to that time, the Burmese Government, unwilling to acknowledge in any way the stubborn fact of the province of Pegu being British territory, had obstinately rejected the repeated overtures of the Indian Government to the settlement of a permanent peace, and had in fact behaved towards that Government in a spirit of passive hostility.

At the time of first turning my thoughts to a career in Burmah, and especially in Upper Burmah, one of the prospects most distinctly in my view, was that of the old route to China by the Irrawaddy being re-opened and made available to British commerce, by an alteration of the then existing feelings and intentions of the Burman Government towards the British. This is not the place to enter into a history of the changes gradually produced in the minds of the chief authorities of Burmah Proper. Suffice it to note that the political

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position, as bearing on this question, is now totally different from what it was during the decade succeeding the last Burman war. The Envoy of the Viceroy and Governor-General has negotiated a treaty, wherein the British and Burmese Governments are declared friends, and trade in and through Upper Burmah is freely thrown open to British mercantile enterprize. Arrangements are there made by which our direct trade with China may be carried on through Upper Burmah without any harassing restrictions, and subject only to a transit due of 1 per cent. ad valorem, on Chinese exports, and nil on imports. A British agent resides at the Burmese court, acknowledged and conferred with by the Burmese Government, under the title in their own language of "Agent to the English minister,"—the Burmese translation of Chief Commissioner referring to his political capacity of agent to the Governor-General, being "Ayebamg Woongyee," a term only applied among themselves to the minister who has the conduct of political affairs, which minister is invariably the chief Woongyee or Vizier,—whose functions are precisely those of a Consul and Chargé d'affaires, taking his instructions from the Chief Commissioner of British Burmah.

No one acquainted with the history of the former relations between the Burmese and British Governments, can fail to see in this, the proof that there has taken place within the last three years, a substantial revolution in the political position of Upper Burmah, and that in looking for routes into Western China, that country must be now regarded in a light not only different from what was formerly the true one, but almost the very opposite. There is no longer a hostile Government shutting up its territory and excluding British trade. The Burman Government is now a friendly one, *inviting* British trade, and not only willing to open to it the high way to China, but fully alive to the advantages that commerce through its territory would confer both on the monarch and the people.

Burmah Proper is no longer a barrier, but a gangway, open to the use of whoever will avail themselves of it.

To the East and North-East of the frontier of British Burmah, hanging about, so to speak, the lower and middle Salween, are several tribes of various Karen races, some of them acknowledging British, others Burman Suzerainty, and others not only really, but nominally quite independent.

Their character is as wild as the mountains they inhabit. The converts to Christianity, extraordinary as has been the success of Dr. and Mrs. Mason among these tribes, are as yet, comparatively too few to alter the general character of the Karen chiefs and people.

4. Passing over the Salween valley, and approaching the northern portions of the Cambodia, there are found Shan States tributary to Burmah, and acknowledging their vassalage, with, in reality, the inverse ratio of their distance from the Burmese capital. To the west of these Shan States are others whose comparative proximity to the Irrawaddy makes them more substantially submissive to the Burmese Government. The Salween may be said to be the line westwards of which the sovereignty is real, while eastwards it is merely nominal. The Tsaubwas, or hereditary rulers of these various states, are independent of each other, and it is this fact with the frequent strifes between them, and even between the several members of one Tsaubwa's family, that explains the success of the Burman policy in regard to them, which is simply "divide et impera."

Crossing the Cambodia, other Shan States are met with, tributary to China, and finally the north boundary of Siamese territory, the west of Annam, and the southern limits of China Proper, are separated by Shans whose allegiance to either of these three Powers, is very ill-defined.

The most important matter, perhaps, for consideration in this division, is the position of the part of China we desire to reach, viz. Yunan and Sechuen.

Unfortunately the province of Yunan has for some eight years past been the scene of a fierce struggle between the orthodox Chinese and Tartar officials on the one hand, and the Mohammedan insurgents on the other. To quote my letters dated from Bamo in 1863—"The Mussulman Chinese, or '*Panthays*,' as they are called, seem to have first suffered what they deemed oppression and persecution. The fierce tenets of their faith soon led them to resistance, and being but a handful in the midst of their Buddhist fellow-subjects, they had to fly *en masse* to the jungles and hills, whence they commenced a dacoity-war on the Chinese towns and villages. The Mussulmans were bound together by their common peril, and afforded another instance of the strengthening influence of a vigorous religious belief, by the success they everywhere met with in combating their numerous, but

enervated enemies. These successes soon attracted to their side a crowd of the innumerable class who had nothing to lose, and were anxious to gain. To these the Pansees gave ample encouragement by abandoning to pillage every conquered town. Not numbering among themselves more than 20,000 fighting men, they have now at their command, armies amounting to between two and three hundred thousand, of Chinese, Shans, and people of the wild hill tribes, Kahkyens, etc. The war has become a struggle that has devastated the country, destroyed commerce, and rendered life and property utterly insecure. The captured cities were dealt with in truly oriental style, of which particulars are needless. The conquerors seem to have restrained themselves from debauchery in order the better to handle the hordes of villains at their command. The Pekin authorities, it is well known, have had enough on their hands elsewhere, and seem to have made no efforts to support the local government. In Western Yunan, at least, this has been, in consequence, completely upset, and the Pansees have formed a regular government of their own to replace it. The seat of this new Mussulman power is at *Tali*, the second city of the province. In that city now resides the Pansee king. The system of government is, as yet, purely military, the country being under the roughest kind of martial law. The king is called *Tuwinseu;* his chief officer, *Sophutyangin*, has the management of affairs at Momien, a large Chinese town close to the Shan States, west of Yunan; and another commander, Tawsuntutu, is stationed at Yunzehan. Many of the highest commands are given to Chinese and Shans who have committed themselves to their side![*]

From conversations at Bammó and Mandelay, with various persons more or less the accredited agents of the Pansee government, I and also convinced that it is the earnest desire of that government to re-open the trade with Burmah. Through these same agents the Pansee authorities will have also been enlightened as to the purely commercial views, the British authorities have in regard to their territories, and the solid advantages that will accrue to them if they facilitate the opening of the routes and afford due protection to the Chinese traders.

* From information I have procured during the past year, I cannot but think that this Pansee ascendancy in Western Yunan is for the present, or until the Emperor of China can spare an overwhelming force to destroy it, firmly established.

The Province of Sechuen not less important to us than Yunan, is, as far as I am aware, unaffected either by the Taiping or the Pansee rebellion.

To the West of Yunan Proper is a small cluster of Shan towns under their several hereditary chiefs or Tsaubwas, commonly called the Shan *Shipyee* or eight Shan States. They are, beginning at the North, Maintee, Sanda, Mainla, Hossa, Lassa, Mowun, Maingmo and Kaingma. These formerly belonged to the Burman Empire, but were lost in the time of Shingpyn Shing, about 1769. On the Pansee rebellion breaking out, the insurgents did not find it difficult to obtain partizans among the disputants, invariably in the families of the hereditary Shan Tsaubwas. By such influence they contrived to get a peaceable submission to their sovereignty in place of the Chinese; and many of the Shan chiefs are in their service, the Nantia Tsaubwa, for instance, who is a Pansee officer under the name of *Taututu*, and the Lookhyang Tsaubwa *Siyintutu*. The temptation to oppression was, however, too strong, and several of the Shan towns, unable to put up with the penalties of Mussulman domination, have again thrown off their allegiance to their new masters and assisted the Chinese commanders still holding out against the Pansee. At Bammó I often conversed with inhabitants of these Shan districts and gathered from what they told me that any settlement would be welcome to them that would save them from being a prey to two enemies at once.

Not unnaturally the Burmese government has been led to think of resuming its former position in reference to these Shan States, important for their teeming population, rich lands, and situation, and I am informed on the highest authority, that some of the Shan towns have invited the king of Burmah to take them into his dominions and under his protection. As "quieta non movere" is, however, a maxim now in much force in Burman policy, it is not probable Burman dominions will grow in that direction. Were these Provinces, however, to become Burman territory, the political obstacles to communication would be very much diminished, not only by so much more of the route being under friendly Burman rule, but by the Kakhyen tribes on the hills, being then pinched in between Burman authority on both sides, and thus more easily compelled to respect the lives and property of travellers, and cease their mischievous hindrances to trade across their mountains.

The Kakhyens above alluded to are a portion of the vast horde of Singphos that inhabit the mountainous districts of Northern Assam, and stretch round the North of Burmah into Western China. These extend not only all along the Northern frontiers, but dip down Southward wherever the mountain ranges lead them, even to half way between Bammó and the capital. They have ousted many Shan tribes, particularly "Paloungs," from the hill districts, and wherever they appear, they assume the same character of lords of all they can reach, and are only to be appeased by some form of black mail. In proportion as their locations are within reach of Burman troops, the chiefs acknowledge themselves vassals of the Burmese king. How strong the tie was even in vigorous Tharrawaddy's time, may be judged of from an anecdote. One of the chiefs of the hills north of Shoaygoo was honoured with special dignity by that king whose golden foot he had worshipped at the capital itself; but having some few years afterwards incurred the displeasure of the Burman ministers, they ordered the local governor to call him, take away his chieftainship and give it to another. The chief came to Shoaygoo, but on hearing why he had been sent for, spat on the ground, saying: "When I take that spittle again into my mouth, the king may take back the rank he gave me," and returned to his hills and to his Tsaubwaship, ruling with increased, rather than diminished prestige.

The tie is at present still more slender. The Kakhyens, as the Burmese call these "Singphos" levy black mail even to within six miles of Bammó, the seat of a Burman governor of the rank of a Woongyee. They inspire such terror, that in the neighbouring plains, no Burman nor Shan will venture alone, or even in company, unarmed along the roads within their reach.

The communities I have now to remark on, inhabiting the range of hills between the Bammó and Momeit valley, and the plains and valleys of the eight Shan States, are identical in race and language with the Singphos of Assam. They belong to various tribes; they obey no common authority, but are divided into numerous little clans, each with its own chief, and each perfectly independent of the others. Some of these chiefs rule a country of a thousand families, others but a few score. They are frequently at feud with one another, and are habitually ready for strife. Their people invariably carry arms, and have among them great numbers of matchlocks of Chinese and their own manufacture.

9. The Burmese frontier is still officially supposed to be on the east side of these Kakhyen hills, and but a few years ago, there were Burmese and Chinese stockades on the western and eastern sides of a little stream, the Lucyline, that marked the limit between the respective territories. Although this outpost has been withdrawn, and the Burmese, now, have no troops further East than Bammó, the Kakhyen chiefs still acknowledge in theory the Burmese Suzerainty, those near Bammó coming into the town at the call of the Governor, and, to a certain extent, obeying his orders.

The Shan villagers along the Taping creek assured me that fifty years ago, there were scarcely any Kakhyens in those hills, but peaceful Paloungs, who have been gradually displaced by them. Signs of former population and extensive culture obtrude themselves upon the attention of the traveller, and corroborate the native assertion that the Kakhyen nuisance is one of only recent growth. The inhabitants very naturally, and, perhaps very justly, throw the blame on the Burman government, whose local officials, careful only for the revenue of to-day, neglect the duty of protecting the people, and leave them, their lands and their property, a prey to these wild depredators whose power for mischief might be not only curtailed, but effectually destroyed, were a little timely energy used towards them.

In the late conflicts between the Chinese and the Pansees, these Kakhyens have often mixed. More generally favourable to the Pansees because they are rebels against the Chinese, who used often to punish them, they have helped in their very rough way either side, according as their immediate interests prompted. Their feelings towards the Chinese may be imagined from what the Chinese themselves told me. "In old times" said they "the Kakhyens on our side of the frontier, were much afraid of the Chinese officials. How many villages have we burnt and how many men have we killed, to punish their robberies of our caravans. Several thousand men would go up and surround a village which had committed some outrage, and burn and destroy every soul and everything; but still after a few months a fresh village would spring up near the same spot, and it would be as bad as the former."

With some of the chiefs of the Kakhyens, on the mountains east of Bammó and Taiping, I became acquainted; and there is no doubt but that these chiefs are keenly alive to the fact, that, not only are they

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the masters of the passes into China, but unless these passes are made use of, they can reap no advantage from them. The language of one of them serves as a sign of the feelings of all: "I will make a road across my district and will conduct any number of merchants safely into China; no other route shall be like it; and I don't care whether they be English, Burmese or Chinese. I want them through my district; and will guarantee that nothing shall happen to them." They, in fact, look on the routes as sources of income, and would be very glad to assist in making them safe and easy, provided they saw it to their advantage to do so; if, in short, tolls were secured to them. They care for no one party or nation more than another: the best payers will have their best good will.

It may be worth while remarking here that the general population of Northern Burmah, above Miadoung, is Shan. There are also along the Upper Defile *Pwons*, and to the west of Katha, *Kadóos*. Both these races, as well as the Shans, are Buddhists, and bear a good character for quiet, agricultural and trading industry. Their languages have a great many words identical with the Kakhyens, Burmans and Shans.

II.—Physical.

1. The Salween, splendid as the channel is near its mouth, unfortunately refuses to permit of navigation beyond a few miles above Maulmain, where commences a series of rapids and rocky passages that it is scarcely to be hoped, can be overcome or avoided by any engineering operations for which either Government or private capitalists could prudently provide the outlay.

2. The route viâ Shoaygyeen to the Salween and along its valley to near Kiangtungye, is so filled with well known obstacles, in the way of mountain ranges, made worse by the character of the Karen tribes inhabiting many of them, that it is unnecessary to speak of it.

North of our Pegu frontier is a great plateau, having a few isolated mountains and some ridges of hills, neither high, continuous nor precipitous. No physical difficulty, in fact, opposes the formation of any description of road across this plain from the Irrawaddy to the Shan mountains. This fact has invited much attention to this route, and up to that point, it is certainly most attractive. But what lies beyond? The very next step is an ascent of, at least 3500 feet above the plain. As far as I am aware, nature has provided no pass or

slope that the most enterprising engineer would think of attempting to make available to a Railway Company who wished to make their undertaking pay. The passes by which the natives go from the plains to the high lands are few, and are all reported to be difficult and tedious, even for the pack animals that now form the only means of transit for goods. The ascent once accomplished, hills and undulating ground at a general level of about 3000 feet continue to be the features of the country till the valley of the Salween is reached. Here a descent is to be accomplished, and if the Salween be navigable, the difficulties are over. But if, as I fear and expect, that river is not available for either steamer or extensive boat traffic, another ascent has to be made on the other side of the Salween, and a still less known series of mountain ranges and high lands must be traversed to reach the Cambodia. This, a much larger river than the Salween, has the character in Upper Burmah at least, of being like it, too rapid and too rocky to serve as a highway of trade. It is at any rate from just below Kiang Hunggyee to Kyangtsen, (*i. e.* from Lat. 20° 30′ to 22°) full of rapids, over which only small boats can be dragged safely.

Beyond the Cambodia, are mountains again, and no one knows what difficulties lie between that river and Esmok, wherever that may be, so that, after all, the route ends in the same unknown region and reaches the same undesirable goal as that advocated by Capt. Sprye.

It has been proposed as the best route by H. M. the king of Burmah himself, to start from the river at the capital and follow the ancient trade route of Thongze, Theebo and Theinnee; and, as far as I am in a position to judge, I think this route to be freer from physical obstacles than any more Southern one. The Irrawaddy conducts you to within 20 miles of the passes up into the Shan plateau. These passes, however, I believe to be quite impracticable for either rail or tramway. In 1861 passing along the westernmost ridges of the mountains where the Theinnee route pierces them, I had to go by paths at a height of over 5,000 feet (by barometer) above the river flats. I have been up and down the western face of the range in that neighbourhood by four different routes, each of them precipitous and not only at present impracticable, but, as far as one, without engineering experience, can judge, such that it appears impossible to make them available for any kind of rail or even tramway, without an expenditure

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far beyond what it is possible to suppose can be made reasonably devoted to the purpose. The ascent once accomplished, however, an undulating and hilly tract of country permits of the easy extension of the road to Theinnee. From Theinnee it is, I believe, an almost uninterrupted plain to the very central point of Yunan city. Other routes are also open, viz., straight to Tali without passing through Yunchan—or again through Manyo to Maingmó and on by the further portion of the route to be next spoken of.

5. From Rangoon to the Burmese capital, the Irrawaddy river is known to be navigable and to be a good channel for steamer traffic. No steamer has, however, ascended beyond the capital further than Tsingoo, above which commences the lowest of the three defiles through which the great river passes in the upper half of its course, and it has been generally regarded as closed to steam traffic beyond that point. On my way up and down the river last year, I was naturally led to note most carefully everything that I could observe, bearing on this question, and took great pains in making such a sketch plan or survey as would serve as a guide to the river for intending navigators. All the obstacles, narrows, rocks, &c., in the way of safety to steam traffic, were there carefully noted, and I cannot do better here than copy the general observations I then made on this portion of the Irrawaddy.

"The chief characteristics of the Irrawaddy above the capital, are the three defiles, each of which has distinct features of its own. Above and below them, the river maintains much the same character as between Rangoon and Ava. In these open parts it may be laid down as a general rule, that navigation meets with difficulties in proportion to the breadth of the river. In the long reaches below Tagoung and in shorter portions equally well defined, where the breadth scarcely varies, and the banks are almost parallel, the channel may be taken anywhere between them. Where, however, the river spreads out into a varying expanse of stream, sandbank and island, the current sometimes fierce and to be overcome with difficulty, at other times scarcely moving; here several fathoms deep, there but a few feet or even inches, the relative positions of the deep and shallow being changed, often entirely reversed in a season, the navigation is intricate and difficult, sometimes even for the native boatmen. Such are the broad portions of the river near Powa, from Moale to Khyannyat—from Tongne to below Thigaim—from Thigaim

to Shoaggoo—and between Sawuddy and the upper defile. Still, even in these parts boats drawing five and six feet of water can always find passage and therefore with the aid of pilots or masters who have "an eye for water," steamers could undoubtedly do so as well.

"The two defiles met with below Bammó are both remarkable for the contrast they present to the other parts of the river in their contracted breadth, their great depth and except in the freshes, their almost imperceptible surface current. The lower defile, extending from Singoo to Malé, has an average breadth of about one-fourth of a mile, the banks are wooded to below the high flood-mark and slope down from the hills whose steep sides form the valley of the defile, so as to afford a continuous series of pretty views, without any grand or imposing scenery.

"The second defile, much shorter than the lower one, is also of another character; approaching it from below, the narrowing of the river towards its mouth is gradual, but before entering it the high hills led one to expect that once within, the scenery would be something totally different from that seen either in the open reaches of the river, or in the lower defile. There was little room for disappointment. Soon hard limestone rocks mottled and striped with calcspar veins, formed the boundaries of the river, scarce a third of a mile across. As the channel narrowed still further, these rocks give place to bold and precipitous hills rising from the water's edge, clothed, where not quite perpendicular, by thick masses of forest foliage,—and then to magnificent precipices, looking naked and defiant over the placid stream, and making the rugged jungle beside them appear beautifully soft.

"The most lofty of these cliffs is about a third of its length from the upper or eastern end of the defile. Overhanging the deep but quiet stream is a rough mass of rock about fifty feet in height, topped, it is needless to say, by a little pagoda, that peeps out from between the branches of some shrubs that have crept up from the jungle below, as if to look up and down the river. Close behind this rock, there rises straight up with one unbroken front, the face of half a mountain of which one cannot help asking 'Who or what has split it in two to let the river pass?' One involuntarily looks to the other side for the remaining half, but there lofty mountains form an irregular amphitheatre, with smaller hills piled one on another, leading up to them from the river side. The face of the precipice, perpendicular as

it is, cannot defy a few hardy climbing shrubs holding on to the lines of crevices and ledges between the strata of the limestone. Their roots and winding stems seem from below to be simply stuck against the rock. This imposing cliff is of the shape of a huge wedge, lying on its side, with one sloping face to the east, the other to the south, and each exposing an immense expanse of reddish grey limestone, streaked with interlacing white veins of calcspar.

"The great Irrawaddy itself seemed awed into quiet and humble limits as it wound beneath the cliffs of this defile. Actually not more than 200 and 300 yards wide, it looked but 100. The surface tranquil, with no perceptible current, the mighty stream of one of the finest rivers in the world, seemed to hide itself, and pass the mountain in the modest shape of a quiet creek.

"Beneath the surface, however, the current is as strong and rapid as it is quiet and gentle above, and it instantly drew the lead from its perpendicular.

"As to the depth, close to the face of one of the cliffs, the ten-fathom line could not reach ground; but at another spot I found bottom near the centre of the stream at eight fathoms.

"At one of the narrowest parts, I found the breadth of the river to be 970 feet, though judging from the eye, I could not believe it more than 150 yards. This defile is thus narrower, shorter, and more winding than the lower, and affords much more picturesque and imposing scenery. Neither the one nor the other, however, can be any obstacle to steam traffic. Except in the freshes, indeed, these are the safest, and easiest parts of the whole river. The spring rises, it is true, are said to cause very fierce currents, and it is not unfrequent that boats are lost in the effort to stem them. But steamers of not too great length and of sufficient power, would avoid the dangers that threaten boats poled and towed along the banks, and if able to conquer the flood stream, could ascend safely in all seasons.

"The few rocks found in the stream and those projecting from the general line of the banks, are noted in the sketch plan of the river. The most serious of these are at *Khyankmo* above Thigame, and just below *Koung-toung*, above the second defile. In both cases, however, there is clear passage for steamers, as indicated in the plan.

"The general course of the river, described as traced from below, is northwards to Katha and then eastwards, (including several bends to

the north-east and south-east,) to just below Bammó, where it again turns northwards, and continues in that direction as far as it has been explored. About ten miles above Bammó commences the Upper or 1st defile, of which it is sufficient here to note, that its irregular banks of limestone, flint and serpentine, would alone make steam navigation extremely dangerous; but the many places where boulders and islands composed of the latter two rocks stand out in the stream, forming a labyrinth of "Scyllas and Charybdises," make it quite impossible. At one spot where the whole Irrawaddy is literally poured through a gorge 50 yards in breadth, the labour and danger of getting a boat up round the jutting rock, even at the time of the slackest current, is very great, and the sensation of peril on being shot through the middle of it, when the river is rising, into the midst of the whirlpools that play below, is one that, once experienced, can certainly never be forgotten."

Two tributaries of the great river, from their position rather than their size, are also worth noticing here. One, the Shoaylee, which comes down from Yunan, close by *Maingmó*, and after traversing the Kakhyen hills, meanders through the Momeit plain, to fall into the Irrawaddy below Bammó, at about one-third of the distance between that place and Mandelay.

Could the passage of that river be taken as a proof that the Kakhyen hills are pierced by a valley, however tortuous, that it would be possible to take advantage of for a great commercial road of any kind, nothing would be more promising than the attempt to make such a road from, say Tagoung by Momeit to the Shoaylee valley, and to follow its course on by Maingmó into Western Yunan.

Unfortunately, however, I could get no tidings of such a valley. Quoting my journal again: "The accounts I get of the Shoaylee in its passage through the Kakhyen hills represent it as a succession of rapids, falls and rocky torrents, through impassable ravines. Once in the plains, however, it becomes a quiet river with numerous Shan villages on its banks. A few miles up from the mouth of the river, beyond which, time would not allow of my going, I find it at this season, (April) an even current of water, of a depth varying from a few inches to over 12 feet, running between banks two and three hundred yards apart, with marks of rise of water in the flood, of twenty feet or more above the present level. It is said to continue of this character

for one day's journey, and then for five days to be a most intricate series of shallows, islands, channels, and sandbanks, to where the Momeit river falls into it. One day leads to Momeit town, and at two or three days' boat journey from the junction, the Kakhyen mountains are met with, and further progress stopped by the rocks of the ravines from which the river issues."

In the dry season, boats drawing three feet can ascend to Momeit. In the summer floods, the largest boats, of 80 and 100 tons can go up for two or three days' journey beyond the junction of the Momeit stream. The river is so winding however, that nine days' journey by the river can be accomplished in four by land, and except for rafts of timber, bamboos and pickled tea, and boats with heavy cargoes, the river is not much used, the land routes along its course being much more convenient for the lighter traffic. The lands near its banks are very low, are flooded in the rains, and reported to be very unhealthy. I may mention too that Kakhyens are "about," even to within a few miles of its mouth. They come down from the hills, and burn the jungle lands on the plains for "Toungya" cultivation, and make all the roads unsafe.

The other river is the Taping. This too comes from Yunan through the same ranges of mountains, and falls into the Irrawaddy. Like the Shoaylee, it is worthless as a guide. I went up it as far as a boat could possibly go, except in the driest season. Issuing from the hills, about 15 miles E. N. E. of Bammó, near the site of the ancient Shan town of Tsempenagó, or the "old Bammó," it is so far a quiet river, of a breadth varying from 100 yards to half a mile, (and now and then enclosing islands, half a mile or more in length, between its channels,) and of depth sufficient even in the driest seasons to give passage the whole way to boats drawing two or three feet of water, and often showing no bottom at two fathoms. In the freshes it rises somẽ 15 feet or more and overflows its banks; it takes a moderately winding course to reach the great river at Suseewah, a couple of miles north of Bammó.

At the point reached by my boat, a few miles within the defile by which the creek comes through the hills, I found the first of the rocky portions that make navigation impossible, and from the manner in which, at that season of the least water, the stream poured through between immense rocks of silicious mica schist, polished and burnished by the friction of the summer flood, I was convinced that if but a slight

rise were to take place, no boat could even approach where we then reached, much less go beyond. There was seen indeed more than enough to verify the description given by the Shans of the utter impossibility of using the stream for navigation. As to depth, we could reach no bottom at 12 feet, even between rocks only 6 or 8 feet apart. Below these rocks the river was like a long placid pool, at the bottom of a deep ravine whose sides were clothed with luxuriant jungle. It is about 50 yards broad, the current on the surface scarcely perceptible, but the depth must be great, for within three feet of the water's edge, the 12 feet pole could find no bottom. Immediately on leaving the hills, the river spreads itself and begins to form large sandbanks and islands between its banks as above noticed.

The mountains just spoken of are the next claimants to attention. I regret very much that I have only been a few miles among them. From what I saw at that partial close inspection, and from the neighbourhood of Bammó and Sauwaddy, and from the information I have gathered from various sources, I believe that they consist of an irregular triple range of hills composed of limestone, mica-schist, gneiss and other primary rocks, running down from the mountain chaos at the east end of the Himalayas, where the Irrawaddy has its sources, and forming the boundary wall, as it were, between the high lands of Yunan, and the valley of the Irrawaddy. On the north it joins the mountains of the first defile, and on the south is connected with those pierced by the second, and it is, I believe, continuous with the range that passes east of Mandelay, down through Karennee to Martaban. The general width of the range, opposite the Bammó basin, varies from thirty to fifty miles. The Irrawaddy slope, about 15 miles east of Bammó, is much deeper than that towards Yunan. The average height of the western ridges, I guessed to be about 2000 feet. The number of passes into and through them as shown by Map No. 2, confirms the belief suggested by their appearance, that they do not form any thing like the obstacles to transit that the more southern portions of the range do. They can be traversed, in fact, from the Bammó to the Yunan side in as little time as is required to merely to ascend from the plain opposite Ava to the plateau of the Shan country, by the Netteik Pass. Of the various routes marked in the Map No. 2, those from Ingtha to Wannim and from Monmouk to Lucylin, are the most used; but those to Maingmó have to traverse the least difficul-

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ties, and I believe that there is more chance of finding a practicable breach for the charge of the iron horse between Sawuddy and Moungsun, than in any other direction.

As above noticed, the two rivers Taping and Shoaylee that pierce the range from east to west, are of no use as guides; even their tributaries render the ordinary routes impassable in the rainy season. None of these mountain streams, however, are of a breadth too great to be bridged in the simplest manner, and wherever bridges are required, there is both timber and stone in abundance, everywhere at hand.

Once across this range of hills the physical geography of the land, as far as we know of it, is not unfavourable to the construction of any kind of road. The Taping and Namwoon valley stretches north and south from Chanda and Mola to below Mowun. That of the Namoung or Shoaylee leads from Moungsun through fertile plains and by large Shan towns, among which are Maingmó and Seefan, to within forty miles of *Momien* on the left, and *Yunchan* on the right. As the regular Chinese trade route is there reached, it is not probable that any insuperable obstacles exist to carrying on the lines and making new bridges over the Shoaylee, and the much more important Salween and Cambodia, where they are already spanned by the Chinese iron suspension bridges.

I have also been informed by travellers who have been there, that from Moungsun there is an almost uninterrupted plain across to the city of Yunan, and that this direct route to that important capital passes over no mountains whatever.

III.—Commercial.

As to British Burmah it is unnecessary to do more than notice the fertility of the soil, its well-known production of rice and the paucity of its population.

Burmah Proper, however, requires more notice, not only from the extent to which it takes our manufactures in exchange for its own products, but also on account of its little known mineral wealth.

The total value of Exports from Upper to Lower Burmah in the year 1862-63, was in round numbers 43 lakhs of Rupees, of which 38½ lakhs' worth went down by the Irrawaddy. This amount included—Sesamum, oil and seed, 6 lakhs; raw cotton 4¼ lakhs; jaggery 5½ lakhs; petroleum

1½ lakhs ; cutch 1¼ lakhs ; timber 1¼ lakhs ; rubies 1 lakh ; sticklack 1⅛ lakhs ; gram 1 lakh ; wheat 1½ lakhs, for the foreign markets or European consumption, and of native silk fabrics 4½ lakhs ; cotton ditto over 2¼ lakhs ; lacquered-ware over 2¼ lakhs ; and pickled tea 1¼ lakhs, for consumption in British Burmah. Nearly all the products thus exported are grown below the capital. They might be increased, it may be said, indefinitely, by a more numerous population, sure of more protection and freedom to dispose of property, than unhappily at present obtains. Large tracts of land to the south and of still greater extent to the north of the capital, formerly producing cotton for the China market, are now abandoned and left uncultivated.

As to the mineral resources, there are three or four distinct places where coal crops out, from which good samples have been procured, and that promise to be the signs of extensive veins. These spots are not distant from the river. Copper is found, but I do not know of the ore being worth working. Iron of good quality is made from the Hematite found near the Paopadoung, N. E. of Sagham, and also near the Arracan mountains beyond Yan. I can also give my personal testimony to the fact that large deposits of the richest magnetic oxide exist in the ridges directly east of the capital, surrounded by limestone which may serve as flux, and forests, (not improbably also coal) which may afford fuel. I can also guarantee that this ore, though it has never been made use of, produces a steel of first rate quality, and I have reason to believe that it exists in abundance within a stone's throw of the banks of the Myit-Ngé. Lead, silver, gold, and precious stones are mineral products of Burmah Proper, well-known to be at present comparatively undeveloped sources of wealth. To these may be added bismuth, sulphur, marble, serpentine, amber, salt and limestone. The iron and the coal are, however, of more particular importance with reference to the question under consideration.

The population of Burmah Proper including the Cis-Salween Shan States, may be estimated at 4 millions, (a very small proportion of this —probably not more than one million—Burman). Already a great portion of this population wear clothes of English manufacture, imported from British Burmah, including 13 lakhs worth of silk and cotton piece goods, 1½ lakhs of woollen ditto, and 3¾ lakhs of cotton twist and yarn. It only requires a better communication and a lower import tariff to increase the number of customers to the whole

Kaingma, is an extensive silver mine, known for ages, but recently abandoned from motives only comprehensible to those in the secret of Burman politics.

As to YUNAN itself, with its ten millions of population and 21 cities of the first order, it is now well known to be, in a commercial point of view, one of the most important provinces of China. In the extreme south are *copper* and perhaps *zinc*, and certainly the finest *tea* in the Chinese Empire. The middle and northern portions are still more rich, the minerals alone including *gold*, *silver*, *copper*, *iron*, *mercury*, *arsenic*, *lead* and *coal*. *Silk*, *tea*, *rhubarb*, *musk*, *hams*, *honey*, and many articles suited rather for the Burman than European market are also produced, and were formerly exported from this portion of the Province. The centre of trade in western Yunan is *Yungchan*, where are the head quarters of the great company that has had for so many years, in its hands, the whole trade with Burmah. All the above-mentioned articles are there traded in. TALI and YUNAN are still more considerable places of trade.

The next province, SECHUEN, is, except in its being more distant, of equal importance to our object, with Yunan. It has a population of some 30 millions, and contains some dozen cities of the first order. It produces *silk* of better quality and more abundantly, I was informed by the Chinese of Bammó, than any other province. Its tea is also superior and abundant. It furnishes rhubarb, musk and several other drugs, and many of the minerals found in Yunan.

QUEICHO is also a province in the neighbourhood of Yunan, and the great artery of trade Yangtsekiang runs up from Yunan, between it and Sechuen. Its products and its market also are well within the reach of British trade viâ Burmah, if the proper route be adopted.

QUANGSI is, I believe, much infested with wild tribes, but the banks of the Tsiking or Pearl River are dotted with Chinese towns connected by roads with the city of Yunan.

The former trade between Yunan and Burmah consisted almost solely of an exchange of the silk, copper, gold, orpiment, quicksilver, hams, honey, drugs, carpets and paper of Western China, for the raw cotton, ivory, amber, jadestone, peacocks' feathers, birds' nests, &c. of Burmah. Little tea was brought over beyond what the Chinese in Burmah consumed and scarcely any of the foreign articles imported into Burmah were taken to China.

The following information regarding some of the products of Western China was given me by the Chinese merchants at Bammó:

Silk.—Two kinds are recognised, *Koezo* from a district of that name, and *Sechuen* from the province so called. Price of *Sechuen* silk, 20 and 25 tickals the bundle of 165 tick; occasionally, however, it rises to 40 tickals. *Koezo* silk from 15 to 30 tickals the bundle. These are prices estimated from the old trade. Not an ounce of silk is sold at present at Bammó. The price of *Sechuen* at the capital is now from 30 to 35 tickals the bundle.

Very little silk is produced in Yunan. Nine bales make a bundle. They are packed first in paper, then oiled paper, then cotton cloth, and finally in case of transport to Burmah, in baskets lined with bamboo leaves, (the same as Kamsuks are made of,) and coarse carpets are thrown over the load of each pack animal.

The Chinese gave me the idea, that the road once open, this article can be supplied in unlimited quantity.

Tea.—The only kinds apparently known in the market at Bammó are the flat discs of China tea and the balls of Shan tea.

The discs weigh 20 tickals each; seven piled together make a packet which used to sell at 1½ tickal and 2 tick. At present no tea is found at Bammó, except the Shan balls.

Western Yunan seems to produce little of this article. To the north and south, however, I was informed it is grown in abundance. *Poour*, a city of Yunan, about fifteen days south-east of Tali, produces excellent tea, and some Chinese informed me that from that district came the tea specially devoted to the Emperor's use. Others, however, contended that Sechuen, not Yunan, produced this celebrated tea. All agreed that Sechuen produces good tea and more abundantly than Yunan.

Copper.—In solid ingots or discs, and in the form of pots. The latter is the best, and used to sell at from 180 to 250 tick the 100 viss. The discs used to sell at from 100 to 180 tick. This is abundantly produced in Yunan.

Gold.—In leaf and in small ingots. Always touched when dealt in. The leaf, more easily and exactly estimated, averages 19 tickals of silver, the tickal of pure gold. It varies, however, to from 10 to 20 tickals. The ingots are less in value, owing to the less amount of certainty in the estimation of their quality, and are generally sold at 8 annas less than the leaf per tickal of estimated pure gold.

Opium.—Packets in paper, one viss each, averaged 20, 25 and 30 tick the viss, but varying from 10 to 50 tick on unusual occasions. The present price is 20 tick when bought by the traders of Bammó from the Kakhyens and Shans, who are now the only importers. The packets are some of them well packed and labelled, and are the produce of China; while the rest are carelessly packed, sometimes adulterated and are the produce of Shans and Kakhyens.

Musk.—This is mostly purchased by the Chinese from the mountain wild tribes. Its present price is 20—25 tick, the tickal, bought in the natural bag. It comes from Mogoung, Khamti and the Shan States as well as from the mountains in China Proper.

Silver.—I was informed is obtained from several mines. Perhaps the same motives led to the localities being not spoken of as to the Chinese telling me that the gold mines were exhausted.

Coal.—Several accounts agreed in affirming that there is abundance of this mineral at Momien and at Tali.

Salt.—There is no salt produced in Yunan as far as I could ascertain.

Sundries.—Straw hats, felt rugs, strike-lights, paper, white and coloured, rhubarb and other drugs, hams, honey, pipes, jackets and pants used also to be imported for sale to Burmans and Shans, and exportation down the river. Formerly at Bammó they used broadcloths and other woollen and cotton stuffs imported from Yunan. Now every thing comes from below, and British stuffs, were pointed out to me as "having come round by sea from Canton instead of as formerly, overland."

The raw cotton formerly exported to Yunan from Burmah exceeded a million of pounds a year. It is used not only for weaving but also for padding the winter garments.

Both this foreign and the internal trade of Yunan are now in abeyance, and for the time, extinct, owing to the disturbed state of that province, and the opposition of the Kakhyen tribes to Chinese traders. The capabilities of the country, however, remain the same. The articles of British manufacture that I could ascertain to be likely to find a market in Yunan, are broadcloths, lastings, blanketings and flannels, manufactured figured and damask silks, calicoes, long-cloth, muslins, jaconets, drills and plain *dark blue* or *black* cotton cloth, for which there is unlimited demand. *Broad-cloth* is universally used by

the Yunan Chinese who can afford to buy it. Blue and black are the favourite colours. Some fine broad-cloth I had purchased at Rangoon at 7½ Rs. the yard, would, at no time, fetch that price in Yunan, I was told. The home-made cloth was described to me as very thick, and used to sell at from 3 to 6 tickals the cubit in Yunan. That which came from Canton overland and from the interior, (Russian ?) they describe as thinner, like the cloth I had bought at 15 shillings a yard at Rangoon, and worth 1·8 or 2 tickals a cubit. There is however no doubt, I imagine, that cloth can be brought from England to Momien, viâ the Irrawaddy, at a cheaper rate than viâ Canton. Cotton twist and sewing thread, cutlery, buttons, mechanics' tools, locks and sewing needles, were also mentioned to me as things wanted for sale in Yunan.

The prices of all these articles have hitherto depended on those of Rangoon or Mandelay. It appears that British goods have never been, to any extent, imported into Yunan, viâ Bammó.

In explanation of the above prices, I should mention that a tickal weight is the 28th of an English pound, and a tickal of silver worth just 1¼ Rupee or half a crown. A viss is 100 tickals or exactly lbs. 3.652.

IV.—Conclusion.

From the statements brought forward under the preceding heads, and especially those under para. 2nd or that of the Physical Geography of the country to be traversed by the proposed line—and not omitting from consideration the new political position of Upper Burmah in reference to us, as well as the direction which any future political changes would certainly take—what then is the best route for European enterprise to avail itself of, in its endeavour to create a China trade through Burmah ?

Granting that the object to be sought is the most feasible way of reaching commercially the products and the markets of western China, especially Yunan, Sechuen and Queicho, it should first be ascertained what conditions should determine the plan to be adopted, in order to obtain that object.

Besides the obvious ones of the least political difficulties and the greatest commercial advantages, are there not others that have not perhaps hitherto been sufficiently thought of ? viz. 1*st*. The holding in

our own hands and having under our control the greatest possible length, at this end, of the line of communication ; 2*nd*. That the plan be capable of being tested without a previous great expenditure ; 3*rd*. That when permanently established, as little as possible of the capital embarked in the means of transit be irretrievably sunk ; 4*th*. That the general route adopted be one already known and made use of by native traders ; 5*th*. That it also be one that—failing the possibility of constructing either a tram or a railway, either at once or even ultimately —may yet be worked with no great hindrance by the construction of a cart-road ; 6*th*. That the changes of mode of transit be as few as possible ; and 7*th*. That in short the greatest safety, cheapness and rapidity of carriage be combined with the least sinking of capital in the fixed plant intended to form the means of transit.

3. If such are the desired conditions, is it not obvious that, provided the Irrawaddy be navigable, and it be feasible to make a road from its highest easterly turn to Yunan, the best means to the object sought, is steam communication between Rangoon and some point near Bammó, and a land road thence to Yunan ? That the Irrawaddy is navigable for steamers just up to the desired point and no farther, I reported, a year ago. That the road across the 30 or 40 miles of Kakhyen hills to the plains of Yunan, can be constructed and ultimately replaced by a tram or railway, I have also recorded my firm conviction. Granted these two provisions, this route, then, sanctioned by ages of use between Burmah and China, shown above to be politically and physically that most feasible to follow, and commercially that most likely to give the highest returns for the least expenditure, is surely worthy of more attention than has hitherto been paid to it. Indeed the reasons for preference are so obvious and so old, that there is no room for a "discoverer," and I long deemed them too evident to need an advocate. It is true that, as long as the Upper Salween remains a river, whose navigability is only "not proven," we are none of us in a position to speak with absolute certainty. In regard to the Lower Salween, and the overland routes to Esmok, we have seen that material obstacles oppose themselves most strongly to their adoption. That, in the advocacy of which Capt. Sprye has so usefully and successfully roused the mercantile community at home, has the disadvantage of passing through hundreds of miles of unsettled country, peopled in many parts by wild and savage tribes, of traversing

several successive mountain ranges, and the valleys of three considerable rivers, the Sittang, the Salween and the Cambodia. But even if the "Emporium" of Esmok be neither a myth nor a hyperbole, that is surely not the point where it is most desirable to tap Western China. It is too far South for the districts we want, and for the desired easy access to the western end of the Yangtsekiang; while Quangsi is certainly not worth the trouble of reaching it by such a route, even if it were practicable. For my own part, I am indeed convinced that my anticipations, as recorded at the time of my first visit to Upper Burmah, will be ultimately realized, viz. that the ancient trade between Yunan and Burmah, viâ Bammó, would be revived and increased to a vast exchange between the manufactures of England and the products of China.

4. Intimately connected with this subject of trade route, is that of the overland telegraph communication between India and British Burmah, and the open ports of Eastern China. In reference to that subject and to the possible railway, I quote from a letter, written soon after my return from Bammó last year.

1. "As to a telegraph from Shangai to Yunan city, a line may and will pass, along the great artery Yangtsekiang.

2. "From Canton to Yunan, the Tsikyang may contend for the line to follow its course in preference to the above. There will probably be both.

3. "From Yunan city there is the regular trade route and high road through Tali and Yunchan to Momien, and thence through Sanda, Mowun or Maingmó to Bamó, or a point just below it. Between either Sanda, Mowun or Maingmó and the valley of the Irrawaddy, is about 30 miles of mountainous country inhabited by Kakhyens. At first these people would not perhaps respect the wire, especially in case of any individual being in want, at any moment, of metal for his bullets, arrows, or spears; but for ages they have been accustomed to give safe escort to dawk runners, and, to begin with, this two days' march may be got over in that way. Trifling subsidies would, however, soon reconcile the tribes and ensure the continuity of the wire.

4. "From the foot of the Kakhyen mountains to Bammó and on through Shoaygoo and Katha to Munipoor, across the country of quiet trading Kadees, there is no obstacle either geographical or in the way of wild tribes. From Munipoore to Calcutta, although in our own

territory and dependencies, would perhaps be the most difficult part of the line. Part of it, however, is already completed by the Assam lines.

5. "Such a line would be almost entirely between Lat. 23° and 25°, and in the case of the Tsikyang being followed from Canton to Yunan, would very nearly describe an arc of a great circle passing through Calcutta and Canton.

6. "From Katha a line would, of course, branch off and connect Rangoon viâ Mandelay and the present Pegu line with Bammó. Indeed this portion from Bammó to Thayetmyo or Prome will be, probably, the first constructed.

7. "A telegraph may go where a railway cannot; but the same reasons that forbid me to think of any other route than the above for the former, force me to believe that if Western China is to be tapped at all from the West or South, it will be by the same route. And if a railway or tramway be required, it will be from the neighbourhood of Bammó to Yunan city. The possibility of such a railway is for the present, I admit, as chimerical as that of one through any other unsurveyed region. By this route, however, the unknown occupies less of the distance than by any other.

8. "*The railway, however, is not necessary to even a vast commerce by the Bammó route.* River steamers and flats can navigate the Irrawaddy up to Bammó. There is the alternative of the Taping river or a perfectly flat road from Bammó to the foot of the Kakhyen hills. Up to this point, the route is through our own and the friendly Burman territory, the latter open to us by right of treaty.

9. "Three or four days mountain route, frequented from time immemorial by thousands of ponies, mules and asses that have carried westward, silk, tea, copper, gold, &c., and eastward, cotton, salt, serpentine, &c., reach Sanda or some other Shan frontier city, whence again the route is taken up by the civilization of China, and carried north-east, east and south-east.

10. "Bammó will be a mart again in a short time, as soon, in fact, as Yunan is quiet enough to make any trade possible; and seeking for any new mart in the unknown regions of Esmok, seems like looking for a new port to get at the cotton of the Confederate States, somewhere in Chili, because Charleston happens to be for the present, blockaded.

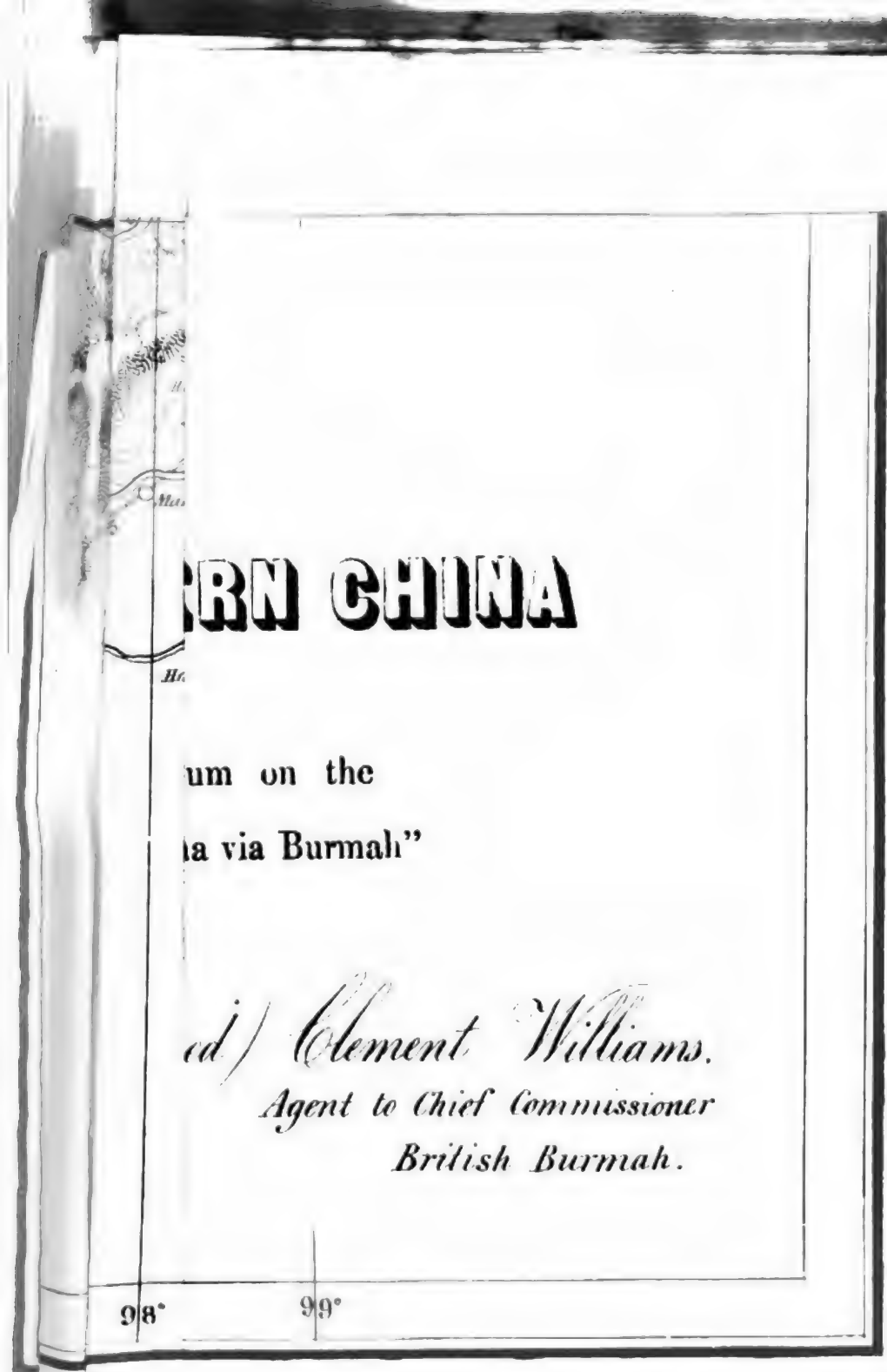
The modification of this route which, I believe will be found advisable is, as mentioned under the 2nd heading, to stop the steam

traffic at a point below Bammó, say *Sawuddy* or even *Koungtoung*, and to make a tram or railroad along the plain to near Masseen (vide. Map, No. 2). The passage of the 30 miles of Kakhyen hills to be made by a good road that may be, by and by replaced by a tram or railway. The telegraph to follow the same line, and both road and telegraph to enter China by the Shoaylee valley at Moungsun, and pass on by Maingmó, Seefan and Minglon to *Yunchan*, instead of passing from Bammó by way of Sanda and Momien to the same city.

11. "Referring to both trade and telegraph route, if any line is possible, it appears to me that this line is the most so. If any line will pay, it must be this, and if any line can be safe it must be this. Such a line will be, I firmly believe, that ultimately adopted, since it will be the shortest, the easiest, the cheapest, and the safest, and it follows the most frequented and oldest trade routes through the most populous and civilized territories between the Indian and Chinese seas."

Whichever be the route followed, however, and it may be that thorough surveys will entirely change the data on which present opinions are founded,—the day is evidently not far distant when Burmah will become the highway for a vast trade with China. Although Yunan is, for the time, so disturbed, I see no reason to fear that the domestic and foreign trade of that province will long remain in its present unsatisfactory state of abeyance. The Pansee revolution may indeed be found to have been useful in breaking up the power of exclusion of the Chinese authorities, backed as this would have been by all the influence of the Chinese merchants, whose jealousy blinds them to their true interests, and especially of the old Burmah company;—the chief of whom is said by the Right Rev. Bishop Chauveau to have 30,000 men at his orders. And while the province is in course of resuming such a settled condition as will make extensive commerce possible, whether it be under the old Chinese or the new Pansee authority, the surveys may be made, the routes and plans of action definitely arranged, and perhaps the communication opened just in time to meet the reviving trade.

The Taping rebellion by impeding as it must do, the commerce between the western province of *Yunan*, *Sechuen* and *Queicho*, and the eastern seaboard, encourages the attempt to pierce those provinces from the west. They form a splendid field, most inviting to the



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Agent to Chief Commissioner

British Burmah.

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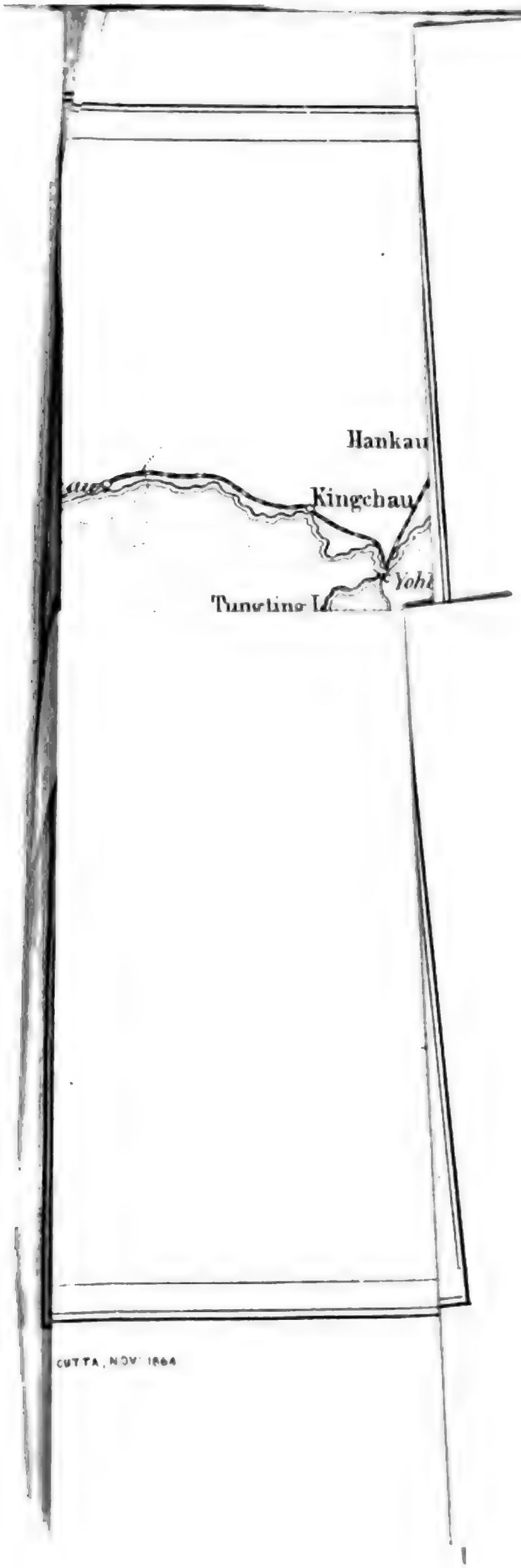
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spirit of enterprise that of old has characterised our commerce. There are forty millions of people waiting to be clothed with British piece-goods, and to be furnished with the handiworks of all the manufactories of England, and ready to give, in return, silk, tea, and the most valuable of the useful and precious metals, from mines that European skill would make many-fold more productive than now.

The barriers imposed by man are removed. There remain but those of nature. To the conquest of these, our science and capital, energy and perseverance will march again as they have so often marched before, and again will overcome them; to British commerce will accrue a new nation of buyers of our goods and sellers to our wants; to the cause of progress, a new opening for the living civilization of Europe to compete with the sickly semi-barbarism of Asia; to the cause of religion and humanity, a new field for Christian truth and beneficence to modify, alleviate and displace the cruelties of a fierce fanaticism and the vices of a degraded infidelity.

With the opening of this new way to China will be written a fresh page in our already glorious commercial history; will be taken another step in our onward destiny, and will be given yet another proof that Providence sanctions the mission we attribute to our race.

Mandelay, April 25th, 1864.

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Table of the Coins of former Governments more or less current in the Bazars of the Goojrat District in 1859.

Communicated by the Punjab Auxiliary Committee of the Asiatic Society.
[*Received 16th February,* 1864.]

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
1	Ghuznee.	None.	Unknown.	8 Mashas.	These coins are scarce, they pass for 11 annas and 3 pies. Their date of coinage is not exactly ascertainable.
2	Alla-uldeen Mahomed Shahi.	Ulsooltan-ool-Azim Ala woodoonia woodeen. Abdool Mozuffer Mahomed Shah al Sooltan. Secunder sani zaheerool Khilafa nasiramiroola nowneen.	883 Hijree.	11¼ Mashas.	The silver of this coin is very pure. The coin is rare, and is much prized, being supposed to carry good luck with it. It is worth R. 1-4 and is often sold for as much as Rs. 2.
3	Feroze Shahi.	Ul Khuleef-amir-ool momneen Khuludulla moolkhoo. Futtyab Feroze Shah muddullah.		9 Mashas.	This coin passes for 12 annas. Only a few are current.
4	Feroze Shahi.	Ul Khuleef-amir-ool momneen Khuludulla moolkhoo. Feroze Shah Sooltanee zurbut fee Khilla Dehlee.		9 Mashas.	As No. 3.
5	Akbari.	Lailaha ililah Mahomed oor-russool illah. Jelaloodeen Padshah Ghazee.	993 Hijree.	11 Mashas, 3 rutees.	The silver of this coin is very pure. It sells for Rs. 1-4 in the Bazar.

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
6	Akbari.	As on No. 5. Jelaloodeen Mahomed Akbar Padshah Ghazee zarb oordoo zuffer pykur.	993 Hijree.	11¼ Mashas.	This coin is frequently met with. It sells for Rs. 1-4 to 1-8.
7	Mahomed Shahi.	Sikka Mahomed Shah Padshah Ghazee. Juloos mymnut maloos moostukurrool Khilafé zurb Akbarabad.	1015 Hijree.	11¼ Mashas.	This coin is very common. Its price is generally about R. 1-0-6.
8	Alumgiri.	Sikka zuddur Jehan Chobudur mooneer Shah Aurungzebe Alumgeer. Juloos mymnut maloos zurb.	1118 Hijree.	11 Mashas, 2 rutees.	As No. 7.
9	Mahomed Shahi.	Mahomed Shah Padshah Ghazi Saheb Qiran sani. Jaloos mymnut maloos zurb dar-ool khilafah Shahjehanabad.	1161 Hijree.	11¼ Mashas.	As No. 7.
10	Cashmiri do suna.	Sikka buzur zud zimahee ta bamah Khooservé gaitee. Sitan Mahomed Shah zurb Cashmir sundo.	1162 Hijree.	11 Mashas.	This is an impure coin. It only sells for 5½ annas.
11	Ahmed Shahi.	Sikka mobaruk Ahmed Shah Padshah Bahadur Ghazee. Jaloos mymnut maloos zurb sahrind.	1204 Hijree.	11¼ Mashas.	As No. 7.

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
12	Ahmed Shahi.	As on No. 11. Jaloos mymnut maloos zurb Etawah.	1204 Hijree.	11¼ Mashas.	As No. 7.
13	Gobind Shahi.	Deg-tegh Futty nusrut be dring-yaft az Nanuk Gooroo. Gobind Sing.	1836 Sumbut.	11¼ Mashas.	Common. Sells for 14 & 14½ annas.
14	Kandar Cashmiri.	Kuraryaft ba hookum i Khoda hurdo jehan rewaj Sikka dowlut ba nam Shah zuman. Jaloos mymnut maloos zurb Cashmir.	1204 Hijree.	11¼ Mashas.	Common but full of alloy & sells only for 11 annas.
15	Nanuk Shahi Poorana.	As on No. 13. Jaloos mymnut maloos zurb Akal.	1861 Sumbut.	11 Mashas, 1 ruttee.	This coin sells for 14 annas and 9 pies. It is often met with.
16	Wuzeerabadi.	As on No. 13. Jaloos mymnut maloos sree Umritsur.	1859 Sumbut.	11 Mashas.	This sells for only 12 annas being full of alloy.
17	Kulladar Jerlu kul.	Sikka zud bur huft Kishwar Sahé Fuzl illah hamideen-i-Mahomed Shah Alum Bad Shah. Jaloos mymnut maloos zurb Furookhabad.	1221 Hijree.	11¼ Mashas.	Sells at par. Only a few are obtainable.

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
18	Kulladar Seedhe kul.	As on No. 17.	1222 Hijree.	11¼ Mashas.	Sells at a discount of 6 pies.
19	Chulledar.	As on No. 17.	1222 Hijree.	11¼ Mashas.	Sells at a discount of 3 pies.
20	Pooklita Cashmiri ek sunna.	Sikka shood roshun zi shahe Noordeen raij az mukh-doom Qootub Arfeen. Zurb khilla, Cashmir sun-i-ahed.	1223 Hijree.	11 Mashas.	Very impure, worth only 6¼ annas.
21	Cashmiri nowa.	Zud ba taeed girdgar Azeem Shah Ayoob Sikka brer zur seem. Jaloos mymnut maloos zurb Cashmir.	1224 Hijree.	11 Mashas.	Very common, worth 10 annas.
22	Tisunna Cashmiri.	Sikka bur zurzud ba towfeeq-i-illah khoosrowe gaitee sitan Mahomed Shah. Zurb khilla Cashmir sun teen.	1224 Hijree.	11 Mashas.	As No. 21.
23	Jelalpooria Golab Singhia.	As on No. 13. Zurb Jaloos mymnut maloos sree.	1865 Sumbut.	10 Mashas, 5 ruttees.	Value 8 annas.

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
24	Cashmiri.	Sikka zuddur Jehan ba fuzl illah gusht raij ba nam Qaisar Shah. Zurb khilla Cashmir.	1225 Hijree.	11 Mashas.	Value 10 annas, uncommon.
25	Kunjur Shahi.	As on No. 13. Zurb mymnut sree.	1866 Sumbut.	10¾ Mashas.	Worth 9 annas, very common; the usual medium of presents at marriages.
26	Goonda Mahomed Shahi.	Gaitee sitan, Mahomed Shah. Durool Sultanut (imperfect).	1229 Hijree.	11¼ Mashas.	Worth 12 annas, common.
27	Moli Ramia.	As on No. 13. Zurb Khilla, Cashmir.	1877 Sumbut.	11 Mashas.	Value 9 annas; rather scarce.
28	Lahori.	As on No. 13. Zurb sree akal.	1877 Sumbut.	11¼ Mashas.	Common and pure. It sells at par.
29	Lukhnow.	Sikka zud bur seemozur az fazl Rubb-i-zool Ennun Ghazeeoodeen Hydené alee nusab Shahé zumun. Jaloos mymnut maloos zurb dar ool Sultanut Sooba Owud.	1842 Hijree.	11¼ Mashas.	Lately become common, imported from Hindustan in considerable numbers. Sells at par.

Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
30	Saheb Singhia.	As on No. 13. Mynut zurb sree.	1882	11 Mashas.	Value 14½ annas, not common.
31	Chitta Nanuk Shahi.	As on No. 13. Zurb sree Akal.	1882	11¼ Mashas.	
32	Lahori.	Sikka zud bur hurdo Alum Shah Nanuk Wahib ust. Futty tegh Gooroo Gobind Singh fazl sucha Saheb ust.	1879 Sumbut.	11¼ Mashas.	At par value.
33	Shere Singhia.	As on No. 13. Zurb sree Akal.	1879 Sumbut.	8¼ Mashas.	Value 11½ annas.
34	Rulia Rami Pind Dadun Khani.	Tegh Gooroo Gobind fazl. Zurb Akal.	1879 Sumbut.	11¼ Mashas.	Par value.
35	Kirpa Rami.	As on No. 13. Zurb mymnut Cashmir.	1876	11 Mashas	An impure coin, worth only 11 annas.

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Figure.	Name.	Inscription.	Year of Coinage.	Weight.	
36	Tomanchi wala.	Saheb Qiran. Jaloos Mymnut maloos.		11 Mashas.	An old coinage of very pure silver: date unknown, scarce; worth 16 annas.
37	Rajah Shahee.	Sheonathjee Sehoy. Zurb sree.	1194 Hijree.		A 4-anna piece.
38	Hurree Singhee.	Sheonathjee Sehoy. Zurb sree.			Ditto.
39	Bahawul pooria.	Sikka Moobaruk. Mymnut sun jaloos zurb.	1261 Hijree.	8 Mashas.	Common, value 11 annas.

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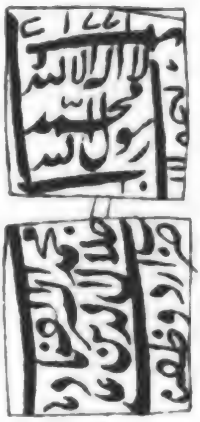

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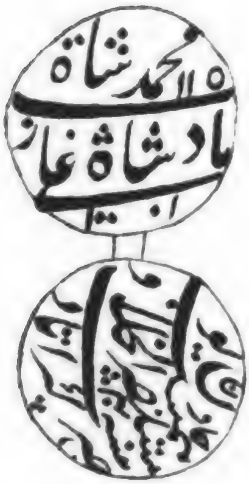

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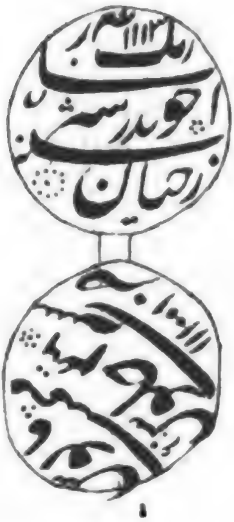

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ON TRANSFER PAPER BY ABDOOL BAREE & LITHOGR BY H. M. SMITH, SURVEYOR GENERAL'S OFFICE, CALCUTTA, OCTOBER 1854

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Property of H. Rahman

Drawn by H. M. Smith Survey Genl. Office, Calcutta, 1864

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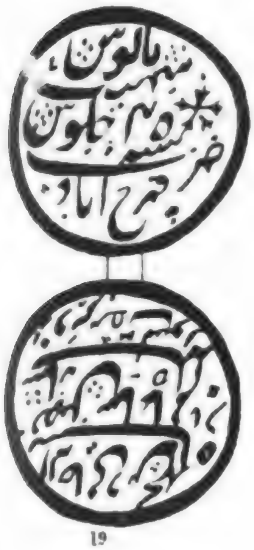
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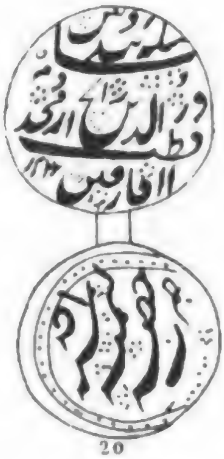
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TRANSFER PAPER BY HAFIZ ABDUL RAHMAN AND LITH^D BY H.W. SMITH. AT THE SURVEYOR GENERAL'S OFFICE CALCUTTA DEC^R 1^M

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ON MACHINE MADE PAPER BY ABDOOL FATTAH AND LITHOGRAPHED AT SURVEY GENERAL'S OFFICE CALCUTTA 1964

Literary Intelligence.

The following is an extract from a letter lately received from General A. Cunningham.

In following up the history of the different races of the Punjab, I have extended the enquiry to the Chinese accounts of the Yue-chi, White Huns and Turks, and I believe that I have succeeded in identifying two of the Khakans of the White Huns and one Khakan of the Turks with some of those who are mentioned in western history. The want of success which had hitherto attended all attempts of this kind has led some ethnologists to doubt the value of the Chinese accounts of the Tartar nations but the identifications which I have already made will tend to remove this reproach. Thus Διζαβουλος the χαγαν of the Τουρκοι, who received the embassy of the emperor Justin is beyond all doubt the same as the great Khakan *Sha-po-lio* of the Turks, whose rule extended to the Caspian. The dates correspond; and so also do the names, for I take *Diza* to represent *Sha* of the Chinese—for which the more correct representative would have been *Dza*. But just as the *ch* = *ts*, of *Chatur* became τεσσ, so the *J* or *Z* = *dz* became Διζ. The name in fact is the same as *Zamol* in *Zamolxis*, and *Zabul* in *Zabulistan*, both of them being only the Scythian appellation of Hercules.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR JULY, 1864.

The Monthly General Meeting of the Asiatic Society of Bengal was held on the 6th Instant.

Captain W. N. Lees, Vice-President, in the chair.

The Proceedings of the last meeting were read and confirmed.

Mr. Oldham said—

"At the last meeting of the Society (June 1st) the attention of the members was directed to a very interesting specimen of a fossil reptilian, which had been received by the Society from Nagpore: and the Secretary (Mr. Blanford) made some valuable remarks bearing on the natural history, and geological age of this fossil. Mr. Blanford stated that the locality where it had been found was within the limits of the area coloured on the Geological Survey map of the Nerbudda valley prepared by Mr. J. G. Medlicott, as belonging to the "Mahadeva" group; and then entered into some speculations as to the possible age of this group, pointing out how essentially the fact of the occurrence of this reptile in the rocks of that group would affect the question of their geological age. As I believe that this fossil has nothing whatever to say to that group, I would desire to record the facts.

"It was stated to have been found about a mile west of Bijori village, at a spot where the stream is crossed by the cattle road from the Puchmuri plateau by Rori, &c. Now a mile west of Bijori, and where the hill path crosses the stream, is well within the limits of the Damuda works, on Mr. Medlicott's map, and as I have been at the spot, I can also say that it is so, in reality. Further the spot indicated on the map by Lieut. Sim, neither coincides with this description of the spot where the fossil was found, nor is it, at the base of

the Mahadeva hills as stated, but on the top. There is, evidently, therefore, nothing trustworthy in either of these statements, as bearing on the question of what group of rocks the fossil in question was derived from. Immediately on seeing the announcement of the discovery, I wrote to the Rev. S. Hislop of Nagpur, asking him to make very particular enquiries as to the locality, and stating my belief that it would be found not to be from the Mahadevas: and, with the permission of the Society, I will read an extract from his letter in reply, the last, I regret to say, of a long and valued correspondence I had with him. His intimate acquaintance with the rocks in his district, gives special value to his observations.

"Mr. Hislop writes—(under date 14th August, 1863) speaking of the fossil in question—'On the footpath leading to the Rori-ghat, Major Gowan met with a detached block of sandstone, bearing the impression of the ribs and vertebral column of an animal, which the natives around were in the habit of calling a fish, but which our countryman more properly considered a reptile. The matrix having been found out of position, it was difficult for the discoverer, or the European officer who was requested subsequently to tread in his footsteps, to ascertain to which sandstone strata it had belonged, whether to the great pile of arenaceous beds that constitute the mountain mass, or to the few that lie below. *This is no longer a matter of uncertainty.* I have had a good deal of experience in the various kinds of sandstone that occur in this province, and the sample from near Bijori I saw at once belonged, not to the Mahadeva formation but to the lower Damuda group. There was an absence of all tendency to ferruginous septa, so characteristic of the former, and an abundance of mica so uncommon in the former, but so frequent in the latter. In splitting some of the laminæ produced by the mica, I detected carbonaceous matter, such as is found between the layers of the Lower Damuda sandstone. *There can be no question then, that the slab is from the inferior strata of our Indian Coal formation.*'

"Mr. Hislop proceeds to describe the characters of the Reptile in question, and to note the particulars which he observed when clearing out the fossils from its matrix. But these are matters relating to its natural history, and my only object now is, to place on record the fact, that the specimen in question had almost certainly, nothing whatever to say to the 'Mahadeva' group.

" Mr. Blanford himself noticed the difference in mineral character of the rock in which this fossil was imbedded, as compared with the ordinary aspect of the Mahadeva rocks."

Mr. Blanford remarked that he too had inferred from the mineral character of the matrix that the fossil was not from the Mahadeva sandstones, but showed that the spot marked by Lieutenant Sim on Mr. Medlicott's map placed it in the Mahadevas, and at some distance from the boundary of the older rocks.

Presentations were received—

1. From the Under Secretary to the Government of India, Public Works Department, an impression in clay of a Sanscrit inscription found at the foot of one of the jambs of the inner gateway of the ruins at Baragaon.

2. From Colonel S. R. Tickell, two specimens of a fish in spirit, supposed to belong to the Cod family.

3. From J. R. Macdonald, Esq., a specimen of a mat used by the natives of Moulmein for thatching purposes.

4. From A. Grote, Esq., specimens of a *Hylobates lar*, and a Centipede.

5. From Dr. Squire, on the part of Mr. Dunn of Akyab, a collection of snakes in spirit.

6. From A. Carlyle, Esq., Officiating Curator, two specimens of a large species of Petrel, a few specimens of North American fresh water and semi-fossil shells, and a piece of Iron Ore from N. Wales, also a few small specimens of native Turquoise found *in situ* in Asia Minor.

7. From the same, a copy of Graves' *Ovarium Britannicum*, also two articles about the battle of Trafalgar and Lord Nelson, published in the *Gibraltar Star* a few days after that battle.

8. From the same, specimens of fishes and crustacea from the Salt Water Lake.

9. From Mr. C. Swaris, a pair of shoes used by the people of Bhotan.

Letters from J. P. Grant, Esq. C. S., and Baboo Ramgopal Ghose intimating their desire to withdraw from the Society, were recorded.

The following gentlemen, duly proposed at the last meeting, were balloted for and elected ordinary members :—

Lieutenant H. Trotter, Bengal Engineers.

J. C. Whishaw, Esq., Civil Surgeon.

Baboo Debendra Mullick.

The following gentlemen were named for ballot as ordinary members at the next meeting:—

Dr. C. R. Francis, proposed by Mr. Grote, seconded by Mr. Blanford.

C. B. Garrett, Esq., C. S. proposed by Mr. Grote, seconded by Mr. Blanford.

W. Swinhoe, Esq., proposed by Mr. Obbard, seconded by Mr. Blanford.

Rev. J. Ebenezer Marks, proposed by Mr. McCrindle, seconded by Mr. Blanford.

The Secretary read the following letter from Mr. Oldham:—

Calcutta, June 21st, 1864.

To the President and Council of the Asiatic Society.

Gentlemen,—While feeling much honored by my re-election to the Council of the Asiatic Society, I regret that I cannot accept the duty without sacrificing a principle for which I have long and strenuously contended. I only ceased to urge the alteration in the rules of the Society which make a certain annual change in the constitution of the Council and officers compulsory, because some of my colleagues, approving the principle, and proposing to act on it, still thought it not desirable that this change should be obligatory.

Glad, therefore, to see this change introduced, as I believe it to be essential to the well-being of the Society, I could not without great inconsistency, again rejoin the Council at present. After the lapse of the proposed interval, I shall be happy to be of any service in my power.

I am, Gentlemen, &c.,

(Sd.) T. Oldham.

The report of the Council, appointing Mr. H. B. Medlicott, a member of their body, vice Colonel Dickens, was confirmed.

The Council reported that they had elected Messrs. J. Strachey and J. Geoghegan to the Council, in the place of Mr. H. Scott Smith, deceased, and of Mr. Oldham, who has declined to accept the nomination.

Communications were received—

1. From Colonel S. R. Tickell, description of a supposed new genus of the Gadidæ.

2. From the Secretary of the Punjab Auxiliary Committee to the Asiatic Society, papers containing a description of Coal in the Khuttak Hills.

3. From R. H. Barnes, Esq., Meteorological Abstract of Observations taken at Gangarowa, Ceylon, from September, 1863, to February, 1864.

4. From Dr. C. Williams, Memorandum on the question of British Trade with Western China viâ Burmah.

5. From Baboo Gopinath Sen, an Abstract of the results of the Hourly Meteorological Observations taken at the Surveyor General's Office in April.

6. From Captain W. N. Lees on the Romanizing of Oriental Alphabets.

Captain Lees then read his paper above mentioned;* and at the close of the reading a discussion ensued on the interesting question of which it treated, in which the Lord Bishop, Mr. Heeley, and the author took part.

The Bishop heartily agreed with Captain Lees that the Roman character should be used in reducing to writing the languages of the aboriginal tribes of India, and regretted very much that Dr. Judson and the American Missionaries had written the Karen language in Burmese characters. He also rejoiced in the willingness which Captain Lees had expressed to apply the Roman alphabet to Hindustani. But he desired to go further than this, and omitting the consideration of dead languages, as involving many peculiarities which it would be too long to discuss, he would gladly see that alphabet used for all the living languages of India. That a change of alphabet was practicable, he considered certain, for it had frequently occurred. The old Hebrew character, now commonly called the Samaritan, was abandoned at the time of the captivity, and for that alphabet (which had probably been regarded as sacred, certainly as venerable) the square Chaldee letters were substituted, in which we now read our Old Testament. The Mahomedans forced the Arabic letters, as a religious duty, on the nations which they conquered; and they are now used in writing languages as different as Arabic, Persian and Malay. Yet the Persians had a character which they must have regarded at least with reverence, and to which they had been accustomed for ages. In Europe

* See *ante*, p. 345.

there had been changes, scarcely less important, from the Celtic and Gothic alphabets to the German and Roman. Captain Lees had quoted the tenacity with which the Germans and Greeks cling to their own alphabets in support of his argument. But in the first place the difference between those alphabets and the Roman is trifling, and the trouble of decyphering them slight. In the second, in each case there had been a patriotic feeling recently at work in favour of the old alphabet: the wars of Napoleon had thoroughly disgusted the Germans with everything French, and therefore with the Roman Alphabet: and the newly emancipated Greeks were anxious to prove their descent from the contemporaries of Thucydides and Plato. Besides, in Germany, the Roman alphabet was making way. Ewald, for instance, had printed his history and commentaries in that character. Again, the Dravidian language in Southern India used alphabets derived from the Devanagri; though they had no affinity to Sanscrit, and therefore they might as well use the Roman. Hence, as the change appeared from historical examples to be practicable, it ought to be adopted, not merely from theological or economical, or any partial consideration, but from the general fact that the multitude, variety, and needless diversities of the Indian Alphabets, made it absolutely impossible to master all the Indian languages, and effectually separated from each other the natives of different parts of the peninsula. Captain Lees had scarcely stated with sufficient force the terrible medley of characters with which the country was afflicted. Dialects differing less than those of Yorkshire and Somersetshire, were written in different characters. The two great parent alphabets had branched out into at least twenty varieties. Orissa had a different form from Bengal: each of the three Dravidian tongues had its own alphabet. A change seemed essential to the civilization of India, and though to attempt to force one upon the people would be wrong, and must end in ludicrous failure, yet books in every living Indian language should be printed in Roman character, and left to make their own way.

Mr. W. L. Heeley maintained that alphabets, like constitutions, were developed by nature, and suited to the instincts of the several races which used them, and that it would be highly difficult, if not impossible, to impose a strange alphabet upon any race which had developed one by its own efforts. We have not yet obtained a scientific analysis of the circumstances under which alphabets had

been adopted; but he thought that the cases, which on a cursory view of the subject occurred to him, would support his belief. The Lord Bishop had referred to the change in the Hebrew alphabet made during the Babylonish captivity, but this was a mere change in the form of letters, like our English change from German text to the present Roman hand; no letters were added or omitted; and the change was not proved to be derived from any foreign, or non-Semitic, influence. Instances like the adoption of the Arabic alphabet by the Turks were cases where a totally illiterate people without an alphabet (for the Turanians of Central Asia do not seem to have developed one,) adopted that of the race most allied to them by politics and religion; and the case of the Magyars was a similar one. That, however, the natives of India took most kindly to the indigenous, or Nagri, alphabet, of which the various alphabets in use are modifications, might be proved in many ways, and among others by the non-success of the Mussulman rulers in introducing their own, or the Arabic, alphabet. Hindustani, though spoken almost all over India, was not the written language of any portion of India; only scholars and Court Amlah could write the Arabic character, and, for the purposes of common life, the native alphabet was preferred even when, as among many of the Bengali Mussulmans, the literature was composed in a *patois* which had more Arabic and Persian words than Sanscrit words. The attempt, therefore, to apply to Hindustan the English alphabet was not likely to succeed. Persons who would not learn the Arabic alphabet would naturally write in Nagri, or one of its derivations. He could not agree in the conclusion to which both Captain Lees and the Lord Bishop had arrived, that, in case of non-Arian languages of limited extent which had not a vocabulary of their own, the English alphabet might be used with advantage, and he instanced the Khonds, hill-tribes of Orissa, who were surrounded by, and mixed up with, an Ooriah population speaking an Arian language with an alphabet derived from the Sanscrit. A Mission had recently been established there, and the missionaries had very properly, in his opinion, printed their Khond books in the Ooriah alphabet. What was the object of introducing the English alphabet? Not that it was more perfect;—the Ooriah alphabet was a far more perfect and useful and better arranged one, and quite as easy to read. The object was to put them *en rapport* with civilization, to facilitate their

acquisition of English. But when are the Khonds likely to want English? Certainly not before the Ooriahs want it; and the knowledge of the Ooriah alphabets would be practically useful to them every day. They will seldom see Europeans. The very work of the mission, and of teaching, will be carried on mainly by Ooriah ministers and catechists; and the business of daily life, the buying and selling, is altogether conducted by Ooriahs. It is clear that in this case the advantages of the Ooriah alphabet outweighed those of the English, and it would probably be found the same, on the most superficial view, in other similar cases. Broadly, it appeared that the civilization of these scattered and insignificant tribes would be better attained by bringing them up to the level of civilization enjoyed by surrounding districts, than by attempting anything higher; what we wanted was not to Europeanize parts of India, but to weld the whole into a compact mass, to give it that homogeneity, the absence of which so much weakens all exertions either of the teacher or legislator for the benefit of the people. If a common alphabet could effect this to any extent, that alphabet must be the one which the *indoles* of the natives of the country had worked out for itself, and which could more easily be learnt than any other, besides being in itself true, perfect, and better than any alphabet we could give them. Mr. Heeley concluded by appealing to Captain Lees for corroboration of the views expressed by him with regard to the non-development of an indigenous alphabet among the Scythian races.

Captain Lees said he was glad the Bishop had favoured the meeting with an expression of his opinion on this question, in which it was known he took a deep interest. He had listened with great interest to his Lordship's remarks, and while he concurred in much that he had said, he thought that much in which he could not concur might be reconciled with the views enunciated in the paper just read. The object his Lordship and those who were of his opinion had in view was universality, and now he thought that sufficient consideration had not been given to the widely-spread area over which the Hindustani language was used, a range of country extending from Peshawur on the north to Cape Comorin on the south. If we applied the Roman alphabet to this one language, no doubt it would familiarize a very large portion of the people of India with these characters. But to do even that, would be a *magnum opus*. It would, moreover, at the

outset at least, be experimental; and it must be admitted that in all experimental undertakings, however good grounds we may have to hope for success, we must not be unprepared for failure. Now, if we were suddenly to print books in all the languages of India in the Roman characters, and introduce them into all our villages and vernacular schools, and the experiment were to fail—*i. e.* if the people generally were to refuse to adopt these characters—there can be no doubt that we should have succeeded in doing a very great mischief. In dealing with Hindustani alone, we tread on sure ground. We make the experiment with some prospect of success, while we reduce the risk of danger to a minimum. It must be recollected however, that the present movement is wholly an outside one. The natives of this country, for whose languages alphabets have been perfected, do not ask for any change. They do not want it. We find the number of these alphabets inconvenient, and we wish to change them all for our own; but we are aliens, and the question is, should such a point be decided by foreigners? In regard to the question asked by Mr. Heeley, I am not prepared at present to enter on a review of the progressive development of writing amongst the Scythians. The early history of the colonies of these races who entered India, is involved in much obscurity, from which it will probably never be unveiled. Their earliest records are to be found on the coins of Bactriana subsequent to the downfall of the Greek kingdom. They are written in two characters—corrupt Greek and Bactrian, merging later into the Indian and Sanscrit alphabet; and as both these alphabets were foreign, it would appear that the early Scythians had no alphabet of their own. The Thibetan alphabet is borrowed from the Indian, and is comparatively modern. The irruption of the Osmanli Turks into Europe did not take place until long after they had embraced Mahomedanism. That people had changed their alphabets, as well as their languages, there can, however, be no question. In fact, if we trace the history of the progressive development of alphabets, we find it to be one continued series of changes, and it is to the variety of directions in which these changes and developments have been made, that we owe the multiplicity of alphabets we now possess, as I have explained in my paper. Nations with imperfect alphabets have never objected to change them. On the contrary, they have shown a tendency to elaborate, improve, and

perfect them, as their ideas and their languages became enlarged. In short, in the East, Mr. Heeley is quite correct in speaking of the indigenous *growth* of alphabets, for undoubtedly in India alphabets have grown with the languages they belong to, and to them they have a prescriptive right. I do not think then that it would be difficult to reconcile the extreme views of either of the speakers with the more moderate and mean position I have taken up.

The Librarian submitted a report of the accessions to the Library since the meeting held in February last.

Library.

The following additions have been made to the Library since the meeting held in February last.

Presentations.

*** *The names of donors in capitals.*

Les Animaux; extrait du Tuhfat Ikhwan us Safa.—M. Garcin de Tassy.

Cours d' Hindoustani for December 1863.—The Same.

Tables of Heights in Sind, the Punjab, N. W. Provinces and Central India determined by the G. T. Survey of India.—The Government of India.

Catalogue Raisonnée of Oriental MSS. in the Library of the (late) College of Fort Saint George, now in the charge of the Board of Examiners; by the Rev. W. Taylor, Vols. II. and III.—The Bengal Government.

Westwood's Oriental Entomology.—Lt. R. C. Beavan.

History of the Reigning Family of Lahore with some account of the Jummoo Rajahs—By Major G. C. Smyth.—The Author.

The Dáya Bhága.—Babu P. C. Tagore.

A Treatise on the chronology of Sinaitic monuments, by His Highness Hekekeyan Bey.—The Author.

History of Hyder Ali and Tippoo Sultan.—Prince Gholam Mahommed.

Brief History of Ancient and Modern India from the earliest period of antiquity to the termination of the late Mahratta war.—THE SAME.

Natuurkundig Tidschrift voor Nederlandsch Indie, Vol. XXVI.—THE SOCIETY.

Illustrations of the Meteorology of India and High Asia, by H. de Schlagintweit.—THE BENGAL GOVERNMENT.

Ditto ditto.—THE INSPECTOR GENERAL OF HOSPITALS.

Official Hand-book of the Punjab Exhibition.—THE PUNJAB GOVERNMENT.

A Collection of Treaties, Engagements, Sunnuds, relating to India and the neighbouring countries, Vol. V., compiled by C. U. Aitchison, Esq.—THE GOVERNMENT OF INDIA.

Indische Studien, Vol. VIII.—THE EDITOR.

On the identification of the Acanthaceæ of the Linnean Herbarium, by T. Anderson, Esq., M. D.—THE AUTHOR.

An enumeration of the species of Acanthaceæ from the Continent of Africa by T. Anderson, Esq., M. D.—THE SAME.

Le Trésor des chartes d' Arménie ou Cartulaire de la Chancellerie Royale des Roupéniens, Par Victor Langlois.—J. AVDALL, ESQ.

Memoires de l' Academie Impériale des Sciences de St. Petersbourg, Tome IV. Nos. 10 and 11.—THE ACADEMY.

Bulletin de l' Academie Impériale des Sciences de St. Petersbourg, Vol. IV. Nos. 7 to 9, and Vol. V. Nos. 1 and 2.—THE SAME.

Annales Musei Botanici Lugduno Batavi, edited by F. A. Guil. Miguel, Tome I. Fasc. 1, 2 and 3.—THE LUGDUNO BATAVIAN ACADEMY.

Memoirs of the American Academy of Arts and Sciences, New Series, Vol. VIII. Parts 1 and 2.—THE ACADEMY.

Proceedings of the American Academy of Arts and Sciences, Vol. V. pages 241—457, &c., Vol. VI. pp. 1—96.—THE ACADEMY.

Proceedings of the Royal Geographical Society, Vol. VIII. Nos. 1, 2 and 3.—THE SOCIETY.

Proceedings of the Natural History Society of Dublin, Vol. IV. Part 1.—THE SOCIETY.

Report of the Proceedings of the Archæological Surveyor to the Government of India for 1862-63.—THE GOVERNMENT OF INDIA.

Annual Report on the administration of the Coorg districts for 1862-63.—The Bengal Government.

Annual Report on the administration of Mysore for 1862-63.—The Same.

Report of a Meeting of the Bethune Society held in honor of Dr. Duff.—Baboo Ramchunder Mitter.

Transactions of the Entomological Society of New South Wales, Vol. I. Part 2.—The Society.

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LÁL GOPÁL DUTT.

July 6th, 1864.

FOR AUGUST, 1864.

The adjourned Monthly General Meeting of the Asiatic Society of Bengal was held on the 11th instant.

CAPTAIN W. N. LEES, LL. D., Vice-President, in the Chair.

The Proceedings of the last meeting were read and confirmed.

Presentations were announced—

1. From the Secretary of the Benares Debating Club, a copy of the Rev. W. Hooper's Lecture on Letters, lately delivered before the Club.

2. From Baboo Jwalanauth Pundit, a collection of Persian and Urdu MSS.

3. From C. Horne, Esq., C. S., two skins of Paradoxurus.

4. From Lieutenant R. C. Beavan, a collection of Indian Lepidoptera (Papillionidæ and Tineæ) a collection of eggs of Indian birds; and two skins of the Paradise Fly-catcher.

5. From R. D. Stewart, Esq., two young bats in spirit.

6. From A. Grote, Esq., a Kangaroo.

7. From Lieutenant C. S. Pratt, of the 31st Punjaub N. I.,

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several Cossyah swords and arrows captured during the late disturbances in those hills.

8. From Colonel C. S. Guthrie, specimens of a peculiar kind of Ivory called "Shermie," used in the Upper Provinces of India, in the manufacture of dagger handles, &c., &c., and said by those that deal in it, to be brought from Russia.

9. From A. C. L. Carlyle, Esq., Officiating Curator, specimens of Plumbago and Manganese Ore, obtained by him from Pedda Kada Kondah in the Zemindary of the Rajah of Vizianagaram, Northern Circars.

The Curator exhibited the following Zoological specimens.—A *Varanus* and two small bittern-like herons *viz.*, a variety of *Ardeola Malaccensis* and a specimen of *Ardeola cinnamonea* shot by him for the Society; a large *Monitor* shot near the Salt Lake Canal; specimens of certain snakes obtained by him, *viz.*, *Tropidonotus stolatus*, *Tropidonotus schistosus*, and *Tropidonotus umbratus;* a specimen of a species of fossil *Clypeaster* found by him in the desert near the Great Pyramid; and specimens of some shells collected by him in the Sunderbuns.

The Curator reported that he had procured from Mutlah an enormous Crocodile, sixteen and half feet in length, for the Society, through the kindness of J. Sturmer, Esq., and H. B. Farr, Esq., of the Mutlah Railway Company, to whom the thanks of the Society are due. The Crocodile is being made into a skeleton specimen for the Museum.

Mr. Blanford proposed that the special thanks of the Society be given to the above named gentlemen; which proposition was put to the vote of the meeting and carried unanimously.

A letter from D. M. Gardener, Esq., C. S., announcing his withdrawal from the Society, was recorded.

The following gentlemen, duly proposed at the last meeting were balloted for and elected Ordinary members:—

Dr. C. R. Francis, C. B. Garrett, Esq., C. S., W. Swinhoe, Esq., and Rev. J. Ebenezer Marks.

The following gentlemen were named for ballot as Ordinary Members at the next meeting:—

J. Beames, Esq., C. S., Collector and Magistrate of Purneah, proposed by Lieutenant-Colonel F. P. Layard, seconded by N. S. Alexander, Esq.

The Hon'ble Elphinstone Jackson, proposed by W. L. Heeley, Esq., seconded by H. F. Blanford, Esq.

Baboo Taruck Chunder Sircar, proposed by Baboo Jadava Krishna Singh, seconded by Captain W. N. Lees.

Captain E. B. Sladen, Madras Staff Corps, proposed by H. F. Blanford, Esq., seconded by W. L. Heeley, Esq.

R. Jardine, Esq., C. S., proposed by W. L. Heeley, Esq., seconded by Baboo Rajendralal Mitra.

The Secretary read the following letter from Lieutenant C. A. Sim, R. E., to H. Rivett Carnac, Esq., Assistant Secretary to the Chief Commissioner of the Central Provinces, relating to the fossil amphibian lately presented to the Society's Museum, a copy of which letter had been forwarded by the latter to the Society.

From Lieut. C. A. Sim, Royal Engineers, to Harry Rivett Carnac, Esq., Assistant Secretary to the Chief Commissioner, Central Provinces.

Gondwarra, dated 23rd May, 1864.

Sir,—In reference to your demi-official communication of the 30th March last, I have the honour to state, for the information of the Chief Commissioner, that, in company with Dr. Orr, I again visited, on the 21st instant, the spot where the Saurian was found in last July.

I then accurately marked the position in the geological map which you forwarded to me: so I need not again revert to the subject of site. The Nandiya stream has been now examined for some distance on both directions of the Saurian site, but I regret to say that no new fossil has been discovered. The rocks in the bed of the stream are mostly of a very hard sandstone; all appear to have been washed down, and to be continually changing their position. The strike or dip of some of these layers of sandstone was observed to be as much as 30° to the north, whilst the dip of the rocks in the base of the neighbouring hills is but 3° or 4° to the same point of the compass. Occasionally, nodules of basalt and layers of shale are met with in the bed of the stream, and this is easily accounted for when the rising ground in the immediate vicinity is examined, for the hills are nearly all capped with Trap, having a substratum of sandstone with heads dipping 3° or 4° to the north.

The presence, then in the bed of the river of both trap and sandstone boulders of a similar formation to that of the neighbouring

hills, leads to the conclusion that the Saurian stone is not a rock "in situ," ut evidently a loose block washed down from a position perhaps higher up the stream, perhaps from the base of the hills in the vicinity. The dip of the river stones is so various that all those at present visible have evidently fallen from above, and are, in all probability, of a recent displacement. The character of the rocks in the immediate vicinity may be described as trap overlying sandstone, the latter very hard, and with heads dipping 3° or 4° to the north.

Trusting that this information may be a sufficient answer to your demi-official communication previously quoted.

I have the honor, &c.,

(Sd.) C. A. Sim, *Lieutenant,*
Royal Engineers.

(True Copy)

(Sd.) H. Rivett Carnac,
Assistant-Secretary, Central Provinces.

The Secretary read the following correspondence that had passed, between the Society and the Government of India on the subject of the proposed transfer of their Museum to Government.

From the Secretary to the Asiatic Society of Bengal, To E. C. Bayley, Esq., Secretary to the Government of India, Home Department.

Asiatic Society's Rooms, Calcutta, 5th April, 1864.

Sir,—With reference to the previous correspondence on the proposed transfer of the Asiatic Society's collections to Government, printed copies of which are hereto appended, I am instructed to inform you that the Council has now received full powers from the Society to enter upon final arrangements with Government on the basis recognised in your letter No. 7622 of the 5th December, 1863.

It is deemed highly desirable by the Council that these arrangements should be entered upon with the least practicable delay, inasmuch, as pending the result of the present correspondence, the Council has deferred the appointment of a properly qualified Curator, in succession to their late Curator, Mr. Blyth, and the collections although as far as possible cared for in all that regards their preservation and display, and continually increased by donation and purchase as heretofore, are not rendered subservient to the extension of scientific knowledge in the same degree that they would be under a skilled Zoologist.

In accordance with the provision of Rules I. and III. as submitted

in the late Secretary's letter of the 18th June, 1862, the Council will be prepared to make over to a Board of Trustees, to be incorporated by an Act of the Legislature, the management, arrangement and disposal of the collections, together with the right of free access to those portions of the Society's premises which are now devoted to the Museum, until such time as the new Museum Building shall be ready for the reception of the collections. The constitution of the Board of Trustees will therefore be a necessary preliminary to further steps in the transfer.

As, however, some delay must necessarily intervene previous to the completion of the transfer, and as a similar delay must be incurred in the selection and appointment of a qualified Curator to the Museum, it appears highly desirable that the two measures should proceed simultaneously in order that the Museum be placed as soon as may be under the immediate charge of a paid officer. It has been long felt that the extent and variety of the collections are such as to render it impossible for one man to perform the necessary scientific work in connection therewith, and at the same time to undertake their preservation, the disposal and exchange of duplicates, &c., and to carry on the business and mechanical duties of the Museum.

The Society's collections are not indeed at present, of such extent as to require the entire services of two specially educated Zoologists, although such a contingency may be fairly contemplated at no distant period. But the Council would strongly recommend that provision be made for one head Curator or Museum Superintendent of high scientific attainments, and for an Assistant Curator such as may be obtained in this country or in Europe on a moderate salary.

The Society is at present in receipt of a total sum of Rs. 500 per mensem from Government, for the support and preservation of the Museum: this sum will lapse to Government with the transfer of the Society's collection. Should His Excellency the Governor-General in Council think it desirable to invite the Society's recommendations with regard to the appointment of and pecuniary provision for a Curator, I am desired to state that the Council will have much pleasure in submitting its views for His Excellency's consideration.

I have, &c.,

(Sd.) H. F. Blanford,

Secy., Asiatic Society.

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From E. C. Bayley, Esq., Secretary to the Government of India,
To H. F. Blanford, Esq., Secy. to the Asiatic Society of Bengal.
Dated Simla, the 8th July, 1864.

Sir,—I am directed to acknowledge the receipt of your letter, No. 177, dated the 5th of April last, and to state that the question of the proposed transfer of the Asiatic Society's Museum to the Government of India, with the view of forming an Imperial Museum, has been submitted for the final sanction of Her Majesty's Government.

Home Department.

2. The Secretary of State has been solicited to select and send out a Curator during the ensuing cold season. The Governor-General in Council is of opinion that until the arrival of that officer in Calcutta, nothing will be gained by the transfer of the Society's collections to Government. The present grant from Government being continued, the Society should make intermediately the best arrangements possible for the preservation of their collections. The exhibition of these should for the present be quite a secondary object.

3. The appointment of Trustees under the contemplated Act will be made on the arrival of the Curator.

4. The necessary steps will be taken in the Public Works Department for the construction of a suitable building for the Imperial Museum. Endeavours will be made to ensure that the building shall be commenced in 1865, and it will, it is hoped, be completed within two or three years.

I have, &c.,
(Sd.) E. C. Bayley,
Secy. to the Govt. of India.

The report of the Council appointing Messrs. J. Strachey and J. Geoghegan, members of their body, was confirmed.

The Chairman then rose and said—

"It is my pleasing duty to announce to the Society this evening the completion of another volume of the very valuable Persian series we are now publishing in the Bibliotheca Indica, and as some account of our progress, and the plan that has been sketched out for us to follow, will be interesting not only to the Society but to Oriental scholars in Europe, I have prepared chiefly from a minute in the Philological Committee, a short memorandum on the subject.

"The present object of the Society in regard to the Persian series of the Bibliotheca Indica, is to aid in working out an idea, which originated with the late distinguished Sir Henry Elliot, *viz.*, to place in the hands of the future historian, the best original materials for compiling a history of this country, and the plan proposed for accomplishing our task is, to publish texts of the most trustworthy authors, giving the preference, when possible, to writers contemporary with the events their histories chronicle.

"I. In this view, we have already published that portion of *Abul-Fazl Baihaki's Tarikh-i al-i Soboktikín* which contains the biography of Mas'úd, the son of Mahmúd* of Ghaznín; and it should be our endeavour, I think, to complete this period from other sources; because the kings of Ghaznín have exercised so material an influence on the progress of events in India, and the affairs of the two countries are so interwoven, that any history of India, without an account of the rise, progress, and decline of the Ghaznín dynasty, would certainly be incomplete.

"I am not prepared to say that materials at present exist and are available for satisfactorily fulfilling this portion of our task, which embraces a period of about 200 years, commencing with Násir ol-dín Soboktikín, and ending with Khosraw Malik, who died A. H. 583.

"II. The succeeding or second period of the History of India, treats of the Afghán dynasties, including the Ghori, the Slave, the Khilji and Lodhi kings. It commenced with M'oiz ol-dín Mohammad Ibn i Sám Ghori, and concludes with Soltán Ibrahím Ibn i Sakandar Lodhi; or, including the interruption caused by the invasions of the Chaghattais, may be carried down to Mohammad Adil, in the year A. H. 963; in which year also Homayún died.

"In furtherance of our object in regard to this period, we have already published the history of Zia ol-dín Barni, which chronicles the reigns of eight kings of Delhi, from Ghaiás ol-dín Balban, to the 6th year of the reign of Firoz Shah, a period of 92 years. Zia ol-dín took up his narrative of events from the point where the author of the *Tabaqát i Násiree* left off.

* The poet Onsarí, a contemporary of Mahmúd and the great Firdawsi, wrote Mahmúd's life, and copies of the book were extant in India a century ago. Whether a copy exists anywhere now or not, I do not know. It would be most valuable for the history of this period.

"The *Tabaqát i Násiree* is a general history, compiled by Minhâj ol-dín Jawzjáni. It commences with the birth of Adam, and concludes with the biography of Násir ol-dín Mahmúd b-Shams ol-dín Altimash, the eighth king of Delhi of the Ghori dynasty.

"It must be evident that that portion of Minhâj ol-din's work which treats of ancient history, is of no value for illustrating the history of Mohammadan India. The account he himself gives of this part of his history is as follows:—

"He found, he says, a tabular chronicle compiled by the Imám Mohammad Ali Abu l-Kásim Imádi, in the time of Násir ol-dín Soboktikín, containing in a very concise form, some account of the prophets, the early and later Khalífahs, and something of the life of Násir ol-dín Soboktikín. This he desired to enlarge; and by giving a more extended account of the kings of Arabia and Persia, including the Tobbas of Yemen, the kings of Himyar; the Khalífahs, the Búyahs, Táhiryán, Saffáryán, Samániyán, Saljúkyán, and Rúmyán, so make a complete history.

"But, for this portion of *general* history, we cannot expect to learn anything very new or instructive from Minháj ol-dín; for, we have older, and better, and more numerous, authorities than those he used; and many of these works have been already printed and published.

"There is, however, a portion of his history which is of great value for our purpose, viz.: that which contains the chronicle of his own times, commencing with the Ghori dynasty, (of the Royal House of which he was himself a *protegé*,) and concluding with Násir ol-dín Mahmúd b-Soltán Altimash. Of the contents of the work, the late Mr. Morley in his catalogue, gave a brief outline: and from the examination I made of the book, his remarks appeared to convey an accurate impression of its value: of the propriety then, of our publishing the portion mentioned, there could not, I think, be a question.

"It might be thought that this author's account of the Kings of the house of Násir ol-dín Soboktikín (in whose time, and by whose order, the chronicle on which Minháj ol-dín professes to have based his account of this period was compiled) would be valuable. But it appears to be very meagre. The reigns of three or four kings, are sometimes discussed in half the same number of pages, three only being allotted to Mahmud the great, and his twelve invasions of India.

"What is related, however, is doubtless taken from the authorities considered most trustworthy at that early period—authorities some of which are no longer extant; and it will be interesting and satisfactory to this Society to hear that the author supports their opinion of Baihaki as a historian, for he opens his account of this period in the following words: 'The Imám Abu l-Fazl Baihaki relates as follows;' and quotes Baihaki often, in preference to Mohammad Ali Abu l-Kásim Imádi, the compiler of the court chronicle and historian of the time, thus establishing, that he had in his possession the last portion of this valuable history, and leaving fair grounds for us to conclude that he consulted it, as the best authority then extant, for the history of the early portion of this period.

"As it was a matter of serious doubt whether we could obtain full materials for illustrating satisfactorily, the history of this period; and as under any circumstances, Minháj ol-dín's brief sketch appeared valuable as a correct index of the truth of other works, our edition of the Tabaqát i-Násir ol-dín commences from the rise of the Ghaznavide dynasty.

"This work we have now completed, and it forms the third volume of those very valuable histories we have published within the last few years.

"III. The third period of the history of the Mohammadan Kings of India, may be said to commence with the reign of Akbar, for though Babar and Humayoon are numbered amongst the kings of Hindustan by most Mohammadan and all European Historians, it cannot be said that either succeeded in founding a dynasty or in consolidating an Empire.

"In fulfilment of our object in regard to this period, we are now about to publish the Muntakhâb al-Tawáríkh or the Tarikh i Badáoni and it is already in the Press. We have three MSS. and copies of the Tarikh i Nizâmi and the Tabaqat i Akbari, from which the author abridged a large portion of his work. This work is divided into three parts: (1.) The lives and times of the Kings prior to the reign of Akbar; (2) the life and time of Akbar himself; (3) Biographies of the learned and pious men who were contemporary with Akbar; and as giving us the character of the great king, from a different point of view to that of all other historians of the day, this history has a special value for that period.

"The history of the greater portion of the earlier periods we shall already have placed in the hands of the public, in the histories of Minháj al-Din and Ziá al-Barni, far earlier and possibly far better sources of historic evidence than those consulted by Abd al-Qadir i Badáoni: we have thought it therefore undesirable to go over the same ground while the history of other periods remained uncompleted. I think it well worth consideration, however, whether in conjunction with this work, we should not publish in lieu thereof a certain portion of the Tabaqát i Akbari which Abd al Qádir professes only to have abridged, and which all later historians have made such good use of. Sir H. Elliot in his Mohammadan Historians, says that "notwithstanding Ferishtah pronounces his history incomplete, he has borrowed from it very freely." But Sir H. Elliot's translator (for he generally marked his passages, and gave them to others who had more time for translating than he had,) has misinterpreted the passage, for what Ferishtah does say, has quite the opposite sense. He says "of all the Histories of Hindustan that have come into my hands, I have not found a single one complete, *except* the History of Nizám al-Din Ahmad i-Nakhsabi, meaning this "Tabáqát," the only thing wanting according to Ferishtah, being the additional information which he himself possessed and which we may assume he supplied in his own large work.

"It would seem hardly fair, viewing the question of character from that even, disinterested and unbiassed point, and with that jealousy proper to the honest and truthful historian, to publish a history, the greatest value of which consists in 'correcting by its prevalent tone of censure and disparagement the fulsome eulogium of the Akbar Namah,' without, at the same time, supplying the panegyric; the more especially as I find in Badáoni's history, abundant proof that his religious bigotry was such as to render it difficult for him to give an unbiassed and impartial sketch of the character, or to draw right conclusions from the actions of so tolerant a monarch as Akbar. No recommendation has yet been made on this subject to the Society but I hope soon to bring it forward.

"We will then have to consider the reigns of the three great successors of Akbar, Jahan-Gir, Shah-Jahan, and Aurang-Zeb, during which, including the reign of Akbar himself, the glory of the Mohammadan power in India may be said to have attained its zenith. But for this

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and the fourth period which we may call the *decline* of the Mohammadan power, no arrangements have as yet been made.

"And here I may convey to the Society the gratifying intelligence which has reached me within the last few days from Mr. Grote, that Lady Elliot has at last placed in the hands of Mr. E. Thomas and our late Secretary, Professor Cowell, the whole of Sir Henry Elliot's MSS. with a view to their being published by our Society, with the assistance which her Majesty's Secretary of State in Council has so liberally offered us for that purpose, and that we shall thus have the means of conferring an inestimable boon on the Oriental World, and at the same time of erecting a noble and lasting monument to that accomplished scholar and distinguished member of our own body, will, I am certain, be most gratifying to all members of this Society who knew him when living, or who honour and respect his memory."

Communications were received—

1. From Lieutenant R. C. Beavan, Revenue Survey;—A few remarks on the Tusseh silkworm of Bengal.

2. From Baboo Gopinath Sen, an abstract of the hourly Meteorological Observations taken at the Surveyor General's Office Observatory in May last.

3. From Bábu Rájendralála Mitra, on the origin of the Hindvi and its relation to the Urdu dialect.

After a few introductory remarks, the author, in this paper, takes a retrospective view of the principal changes which the Sanskrit has undergone in its transition to the modern vernaculars of India. The oldest vernacular, next to the Sanskrit, he says, was the *Gáthá* dialect, which prevailed at the time of Buddha's death in the fifth century before the Christian era. This was followed by the Páli in the time of As'oka, Emperor of India, and it changed into the different Prákritas a little before the birth of Vikramáditya. Nothing is known of the north Indian vernaculars for a thousand years after this, until the time of Prithíráj of Kanouj in the tenth century, A. D. when the Hindvi became the vernacular of the most civilized portion of the Hindu race. The Hindvi has since that time undergone many changes and been divided into several dialects, but it is substantially one language, which, in its grammar, bears the closest analogy to the Sanskrit. This the author proves by a detailed analysis of the inflectional and conjugational terminations of the Hindvi as well as of the

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auxiliary verbs, and pronouns. The Hindvi among the Mohammadans has become the Urdu. Its grammar is strictly Hindvi, but its vocables are partly Hindvi and partly Persian and Arabic. Thus the Urdu, which is also called the Hindustani, is nothing but Hindvi with a variable proportion of foreign elements. Inasmuch, however, as such foreign admixture does not alter the genealogical affinity of a language, the author contends that the Hindustáni is an Aryan and not a Semitic dialect. He next enters into an examination of the capability of the Roman characters to represent the phonology of the Hindvi and the Urdu, so as to supersede the use of the Native alphabets, and comes to the conclusion that the introduction of these characters into the Mofussil Courts, for the writing of Native dialects would be troublesome, impolitic, mischievous, and in no way conducive to the good of the people;—troublesome, inasmuch as they cannot be used for the Native languages without a multitude of diacritical marks which, in Lepsius' Standard Alphabet, affect no less than 160 letters, and which can never be attended to in rapid writing; impolitic, because it will create disaffection among the people who cannot but look upon the supersession of their ancient and superior alphabet by an imperfect one utterly unsuited to their wants, as highly oppressive; and mischievous, because it would lead to frequent and serious mistakes in the judicial records of the country. The great want of India was a *lingua franca* and not an universal alphabet, which last, without a common language, would be a name and an idea, but of no possible practical good.

Captain Lees said:—"I did not anticipate it would be necessary for me to say anything this evening; but as no other member of the Society has risen, I cannot allow the meeting to separate without an expression of opinion that our special thanks are due to Babu Rajendralala Mitra, for the excellent paper he has just read, on a very interesting subject. It will hardly be credited by the members of this Society, who may be supposed to be better informed on this subject than the outside public, that notwithstanding the Hindustanee language is the *lingua franca* of India, and understood from Peshawur to Cape Comorin, and notwithstanding that the English have had India now for upwards of a century, the Essay that we have just heard read, is the first scientific paper of the kind that has ever been written in India. Dr. Trumpp's paper on the dialects of India, to

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which the Babu has frequently referred in his lecture, may have been prepared in this country; on that point I am not informed, but it was published in a foreign journal and must be credited to the country to which that journal belongs. While expressing, however, my great satisfaction at the manner in which the subject has been handled, I must correct an error into which the Babu has fallen, in stating that I had said that the Hindvi or Hindi had no alphabet of its own. He has been led into this error probably by an imperfect recollection of what I said, as when he has had the benefit of reading my paper in print, he will see that what I did say has quite a contrary sense. The language which I said had no alphabet was the Hindustani, and the only difference between us appear to be that while he has considered the Hindvi or Hindi, the Hindustani, and the Urdu as one language, I have considered them as three languages. If it be admitted, what is asserted, that ninety per cent. of the vocables of Hindi are Sanscrit, which I think is probably true, I am not at all prepared to admit that in Urdu the proportion of Arabic and Persian words is only fifty per cent. In ancient Urdu, it was much less; but if the Babu had read the Soroor i-Sultani and many modern works published at Lucknow and Agra, he would find that the percentage of Indian words in them is quite as few as the percentage of foreign words in Hindi. In short, it is so infinitesimal, that this element can hardly be recognised at all; and to such a language, I think the Deva Nagri Alphabet would be quite as inapplicable, as the Roman alphabet would be to Hindi. I think, moreover, that my learned friend has laid too much stress on the influence the origin of a language ought to have on the characters in which it is written. This, in my opinion, has very little to do with the question, as alphabets in all countries of the west have been children of adoption, foreign to the countries and the languages which have adopted them. Turning again to the more immediate subject of the lecture, I am quite prepared to admit, that the balance of evidence in regard to the grammatical structure of Hindi, in common with the other Vernacular dialects of the Upper half of India, is strongly in favour of its having reached us through the Prakrit from the Sanskrit; but I do not think that the arguments used by Dr. Trumpp, nor yet the additional arguments that we have heard this evening, are sufficient to satisfy those who hold opposite views. It must be borne in mind that one of

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the laws on which the dignity of a science is claimed for language, and on which Babu Rajendra Lal Mitra has based his strongest arguments, is that of phonetic corruption and grammatical regeneration, whereas it is impossible to arrive at a Sanskrit origin for the vernaculars of upper India, or for the Hindi dialect at least, without violating this law, and admitting grammatical or structural corruption as far more serious than anything that has taken place in phonetics. I do not at all wish to dispute the position, for, as I before said, the balance of evidence is certainly now in its favour; but the subject is not exhausted, and cannot be exhausted until we know more of the numerous dialects which are spoken by those rude people who inhabit the fastnesses of our central and frontier ranges of mountains. These dialects we may count almost by scores, but of the most of them we literally know nothing, and until we do, it is almost impossible to say what influence, (if any) they have exercised on the modern vernaculars, or even the older dialects of India. The learned lecturer has drawn attention in the opening of his paper, to the influence that special knowledge has had on discussions on this highly interesting subject, but in admitting the justness of his remarks, it becomes doubly necessary to guard against falling into the very error of which he has warned us. It is not very long ago, indeed the time is so short, that it will be in the memory of most here present, that all language was supposed to be of Semitic origin: our sacred Scriptures were written in Hebrew; our earliest history records were transmitted to us through that medium; all the dialects which are now current in the regions of its birth, and all those which existed for ages past and were lost, were asserted to have sprung from this most ancient of all languages. But little more than half a century ago, the researches of Sir William Jones, Colebrooke and other distinguished members of this Society, and addresses read from the very chair, which I now accidentally and unworthily fill, let in a flood of new light, which has since revolutionized European ideas on the subject of language; and it is not twenty, nay it is hardly fifteen years ago, that the antiquity claimed for Sanskrit was resolutely disputed by men of high attainment. For the last ten or fifteen years, however, everything has been Sanskrit; and the learned lecturer, in common with most others who have written on the subject, has traced all our Indian dialects back to that mother tongue. Now, at the present day, it is impos-

sible to refuse to admit that the Sanskrit language is of most remote origin—so remote, that with our present imperfect means of research, we find ourselves entirely at fault, if we attempt to elucidate its early history; but though it is impossible to discover a new language like the Sanskrit, bearing in mind what has taken place, and looking to the rapid strides that within the last two or three years have been made in researches in the Zend language of the ancient books of the Parsees, and the arrow-headed Inscriptions in that language, we must not put out of mind the possibility of our one day being in a position to ask, "If all the modern dialects of India are based on the Sanskrit language, on what language is the Sanskrit itself based?" Nor in making this remark do I wish to cut anything off the age of the Sanskrit. At present, the language is altogether prehistoric, and may possibly remain so for ever. We cannot be blind to the fact, that speaking chronologically, we are first brought in contact with it not at the beginning but at the end of a period. The first date which we can grapple with anything like chronological precision, is that of Sakya Muni, and his era records,—not the dawn of a civilization such as we meet with in tracing the early history of many other nations we now call ancient, but a revolution and the overthrow of a religion, and a system which had existed certainly for very many centuries before, and in which he was not the first reformer. That the Vedas are long anterior to the period of Sakya Muni, his existence is sufficient proof. But beyond this isolated fact, besides the internal evidence furnished us by the Vedas themselves, we have little to guide us. The exact spot from whence the Aryans came is doubtful; when they entered India we cannot even conjecture; but if by the *rakhshases, daityas* &c. spoken of in the *Mahabharat*, (which no doubt contains the history of a period much anterior to that of its composition,) and represented by the learned lecturer as being driven to take refuge in the rocks and caves of the hill fastnesses, and in a great measure exterminated, as have been the red Indians in North America, are to be understood the aborigines of India, it appears to me, that we shall have some difficulty in placing that remnant of the other colony which now inhabits the southern half of the Peninsula, and whose languages, the Tamil and Telinga, proclaim them to be of Scythian origin. It is generally admitted that these people reached India by the same route as the Aryan colony, and how they could

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have travelled south, if the north had been already occupied by a strong and powerful race of Aryan people I do not quite comprehend. We have incontestable proof in late researches, that the religion of China went from Ceylon, and that India received nothing from the seaboard. But I must not detain the meeting longer. The subject now so ably handled by my friend Babu Rajendra Lal opens up questions of the deepest interest in Ethnological, Philological and Historical points of view, which instead of being exhausted, are comparatively fresh; and I trust that the interest excited by his paper will be such as to ensure us many more of them from other parts of India from persons as competent to deal with the difficulties with which they are surrounded as he is."

The Honourable G. Campbell had great pleasure in very heartily seconding the proposal for a vote of thanks to the learned member whose most interesting and instructive paper had been heard with so much profit. Not being himself a scientific linguist, he could not presume to pronounce an opinion on a matter which depended on a skilled comparison of Grammar and structure, but the subject was one which had been too much neglected: he was sure all the members took the greatest possible interest in it. The arguments of the learned gentleman seemed most convincing, and if much might still be said on the subject, all must feel under the greatest obligation to the learned gentleman for so well broaching it, and provoking a discussion which will no doubt eventually throw complete light on the matter.

One word he would like to say as a mere lay bystander, on the point last noticed by the learned gentleman, viz., the character to be used in writing the Vernacular language. He had understood the learned gentleman to say,—that the character used by the unhappy gentleman of Agra, who was so unfortunate as, by a badly written note, to induce his wife to commit a premature Suttee, was Hindi. Now, he must say that story seemed to tell against the learned gentleman's argument, for Hindi being one of the Nagri characters which he extolled, if all adopted that character, a similar inopportune accident might happen to any one of the present company. The fact seemed to be, that although the Nagri in print or carefully written, is a very clear and precise character, it appears to be too angular and square for use in common writing, and in all parts of India some rounded modifications of it had been adopted for ordinary

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use. Those modifications were exceedingly difficult to write and read. As regards the most common character, the Hindi, he must say, that he had known many people who wrote that character, but very few who could read their own writing, and scarcely any who could read any one else's writing. Bengali might be better, but, coming as he did from a part of the country where the Persian character was used in official business, to one where the Bengali character was used, he could not but be struck with the very great inferiority of the latter for practical purposes, being as it was, so very slow to write and so little rapid or smooth to read. Those defects seemed to affect all the modifications of the Nagri commonly used, and he doubted whether they could be got over.

Then as respects the Roman character, the remarks of the learned gentleman suggested to him (Mr. C.) what had occurred to himself, viz., that in the discussion on this subject, sufficient place had hardly been given to the very important question, whether in fact this Roman character is really good in a phonetic point of view; whether it has phonetic qualities of that catholic stamp which would render it fit for universal use. Being as he had said not scientific, he could not venture an opinion on this point, but as a practical man he could not help mentioning that doubts had occurred to him, from what he had seen of the use of the Roman Alphabet, when applied to two languages foreign to it. One of these was the English. Now they well knew that no language in the world was written in a less phonetic way; in none was there such a discrepancy between the writing and pronunciation, so much variety and uncertainty in the use of the same letters, and so arbitrary an attribution of various sounds to those letters. He could not but fear that great part of this difficulty might be due to the application of a foreign Latin Alphabet to a Teutonic dialect to which it was unsuited. Again, we had seen a partial application of the Roman character to the ordinary vernacular Hindustani of this country. And he confessed that such attempts as he had seen, appeared formidable and horrible to the eye, and he never could make head or tail of them. The immense variety of spelling when Roman letters are applied to Indian words, also seemed to indicate difficulty. A gentleman had two or three years ago published a guide book to India, in which for the expression of Indian names and terms, he used the Roman alphabet in what he considered

a phonetic way. The result was, that it was impossible to recognise the most familiar of our old friends. To take an instance, we know 'Cawnpore,' well enough but when we come across 'Khanpur' we can make nothing of it. It did appear to him that the phonetic excellence of the Roman character had yet to be demonstrated.

There remained the Persian character now so extensively used throughout a great part of India. Of course he meant the Arabic character as modified and used in the modern Persian, and here generally called the Persian character. He had much practical experience of the use of this character, and thought it could not be for one moment denied, that for ordinary business, and all the purposes of cursive writing, this character possessed enormous advantages. It is true, he said, that there is a want of precision and certainty about it, when used to express foreign proper names and words not of customary use, being in fact, as ordinarily written, a sort of refined short hand; but even this could be for the most part remedied by the use of Arabic punctuations in regard to particular doubtful words, and by the introduction of our stops and capitals. It is also true that the free use of this character requires much practice; that in fact it is not fitted for rude beginners, and can only be used with advantage by highly educated people. But as used by them, it undoubtedly possesses a facility both for writing and reading unrivalled, and is not only first, but is without a second. The rapidity and facility with which business is conducted in this character, as compared with any of the Nagri forms or even with English, is astonishing. In truth he could hardly doubt that as it is a later product of the human mind, so it is a more refined and polished instrument of human art than the Nagri or Roman characters.

Without therefore venturing an opinion, which he was ill-qualified to prove, he would only venture with much diffidence to throw out a suggestion whether there might not be advantages in the simultaneous use of several alphabets now prevailing in the greater part of India. The arguments of the learned gentleman whose paper they were discussing, had certainly suggested to him grave doubts whether uniformity of alphabet is really so great an object, when there is diversity of language, for as the learned gentleman well said, the time required to master an alphabet might be measured by hours, while that required for a language must be measured by years. If then a

second Alphabet renders the use of a second language more easy, might not the hours required to master the second Alphabet be well spent? His suggestion then was this: whether the vernacular Alphabet of Nagri type or better the Nagri itself might not still be used for the lowest form of instruction and the expression of the most vernacular form of languages by villagers and children; also perhaps for matters of accounts and some village records, whether the higher education of all the more educated classes might not still be conducted in the Persian character, so much the best for cursive epistolary and ordinary business transactions; and whether, for the higher official business and record, for the higher literature, languages and science, the English language might not gradually be brought in, instead of attempting to force the Roman character before the English language.

For September, 1864.

The Monthly General Meeting of the Asiatic Society of Bengal was held on the 7th instant.

Captain W. N. Lees, Vice-President, in the Chair.

The Proceedings of the last meeting were read and confirmed.

Presentations were received—

1. From Lieutenant Waterhouse, a set of Photographs of ruins at Pathari.

2. From Major General A. Cunningham, a rubbing of an Armenian Inscription from a grave-yard in Behar. The Inscription was sent to Mr. J. Avdall, by whom it has been translated. He says—"It is devoid of any public or literary interest."

3. From Lieutenant R. C. Beavan, a collection of Indian Lepidoptera and a grass Parrakeet.

4. From J. Cock, Esq., a collection of Coleoptera from Assam.

5. From W. L. Heeley, Esq., a Mantis.

6. From Major C. Herbert on the part of A. Grote, Esq., a Kangaroo.

7. From Mr. C. Swaris, a Bird of Paradise.

8. From Captain A. B. Melville, a set of Stereoscopic Photo-

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graphs* representing the principal characters of a mystery play witnessed by him at the Hisnis Monastery between Leh and Ladak.

The following letter accompanied the presentation :—

"*Dehra Dhoon, August 20th*, 1864.

My dear Sir,—In the beginning of 1863, as we were marching up through Ladak towards the Pungong Lake, where our survey operations for that year were to be carried on, we were delayed several days by rain at the village below the celebrated Boodhist monastery of Hisnis, which is situated in a lateral ravine about two marches up the left bank of the river Indus above Leh. While encamped here, we got information from one of our guides about the religious mystery plays performed by the monks on certain religious festivals. They are mentioned in Moorcroft's Travels, Vol. I. page 345. By means of a present to the Abbot, we persuaded him to give us a private performance. Luckily, having photographic apparatus with me, I arranged to take negatives of ten of the principal characters, prints of which I now enclose. I have put the names I obtained on the back of each.

I was greatly struck with the resemblance of this play to the Burmese *poeys* (or Nautch,) that I saw in 1853, particularly as to the masks and demons introduced, and I have been informed by an officer who assisted at the reception of the Burmese Ambassadors in Calcutta, that the head dress shown in No. 6 is almost identical with some of the head dresses then worn by the Burmese. It struck me also that there was a very strong resemblance between this play and the old Roman Catholic feast of Unreason or All Fool's Day, so well described in one of Sir Walter Scott's novels, either the Abbot or the Monastery. The Band shown in No. 10, throughout the whole of the performance, kept up a low monotonous music, accompanied by a low chant of monks. The figures came in, generally in groups of 5 and 6, and after dancing a short time, retired into the monastery, and were replaced by others: occasionally a jester and a sort of harlequin, with him, came in with the other characters, and played practical jokes on each other.

* Endeavours will be made to reproduce these for publication in a future number of the Journal, in conjunction with a more detailed description of the play, communicated by Captian H. H. Godwin Austen.—Eds.

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The plot, as far as we could make out, seemed to be a Ladaki Royal Court, with gods as the chief personages instead of kings, and, in one part of the performance, the characters represented in No. 4, and several others came in, attending on Thlogan Padma Jagnas who had a large umbrella held over him. These then performed a slow solemn dance.

The characters represented in No. 3 were always seated in line, with the bell and a small drum in their hands, and appeared to represent the courtiers. There is a wonderful resemblance in their dress to some of those worn in Roman Catholic processions.

The dresses were very handsome, being made of thick China silk covered with devices, in which the dragon continually figured. The masks were beautifully made of papier mâché. One peculiarity about the costumes, is the continual use of the human skull as an ornament, as shown in Nos. 4 and 5; and nearly all the masks have three eyes, one in the centre of the forehead.

The figures in No. 1 had a most remarkable hat with long streamers of different coloured silk flying behind. Their dress was, I think, the handsomest, and as they moved round in a sort of revolving dance had a strange and very novel effect.

The great peculiarity of No. 2 was that they had masks of brightly polished brass, which the name indicates, *azong* Copper and *bukha* masks. No. 9 appeared to represent some sort of fight. There were twelve characters, all with flags, with three eyes painted on them, fastened to the top of their head dress. They were all dressed alike, with the exception of 6 having red masks and 6 brown. The red masks *(Numking)* came running in from one side and the brown *(Tsaking)* from the other, and performed a sort of war-dance, striking each other's drums, &c., and then retiring as they had come in. No. 7, was perhaps the most remarkable of all the dresses: it was an attempt to represent the dance of death. Only two characters came in, dressed as skeletons; their masks were beautifully made, and had springs by which the jaws opened and shut, and thus enhanced the effect.

No. 8 apparently represented the divinity to whom the monastery at Pituk near Leh, is more particularly dedicated.

Besides the characters I have described, there were many more, but very similar, and I think the photographs I have sent will give a very fair idea of the costumes and dresses. What is the meaning of these

plays and whence their origin, is a point well worth inquiry. Captain Godwin Austen, who was one of our party was lucky, enough to purchase a manuscript giving the stage instructions for these plays; he is trying to have it translated, and I hope it may throw some light on the subject.

From the monks themselves it is impossible to find out any thing; either the origin and meaning of these plays has been lost, or is confined to the monasteries near Lassa, or else they are unwilling to divulge the mystery.

Captain Godwin Austen told me that as he was returning by the Gaurin monastery, he saw a similar mystery play going on: only they had the body of a man made of dough in the centre, on a sort of bier, and they were dancing round, firing arrows into the body and cutting at it with swords. This reminded me very much of the old days of magic in England, when we read that to do a person an injury the magician used to make a figure of that person in wax, imagining that the wounds and tortures he inflicted on the figure would be extended to the actual person.

I hope shortly to send another set of photographs, illustrating the monasteries and idol rooms of Ladak.

Hoping that this slight sketch may interest some of the members of the Society.

I remain, &c.,

(Sd.) A. B. Melville, *Capt.*,
G. T. Survey.

To the Secretary, Asiatic Society, Calcutta.

Bábu Rajendralála Mitra read the following note on a hoard of Páṭhán Coins lately discovered in Cooch Behar.

"A short time ago, Colonel Haughton announced the discovery of a large hoard of ancient Coins in Cooch Behar, and suggested that it might be received as bullion by Government, as part of the annual tribute of the Cooch Behar estate, in order to enable numismatists in Calcutta to have a sight of it.

"The Coins have since been received at the Mint, and I have had several opportunities of examining them. They number 13,500, and comprise specimens of the coinages of eight of the Páṭhán sovereigns of Delhi, and of four of the independent Páṭháu kings of Bengal.

"Though presenting no great features of novelty, these coins are

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of interest as affording a number of varieties which were hitherto unknown. This is what was to be expected in a large collection, inasmuch as the art of die-cutting was in so primitive a state in the days of the early Páṭháns, that no two dies could be turned out exactly alike, and their produce was necessarily very different. Muhammadan sovereigns, besides, took great interest in the designs of their coins, and frequently changed them, and in long and prosperous reigns this too led to a great multiplication of types and varieties.

"The great bulk of the find consists of the coins of Shamsuddin Iliás Sháh Bangarah, Sikandar Sháh bin Iliás, and Ghyásuddín Ázim Sháh bin Sikandar, three of the earliest independent kings of Bengal. Of the first of these, there are three distinct types, the first having the legend enclosed in a large circle on the reverse, and the second in a small circle; the third having a double line square framing on the obverse. Of varieties of these types there are no less than 20, but they are due entirely to the die-cutter, and therefore call for no notice. Of the coinage of Sikandar, son of Iliás, there are no less than six distinct types, four of which have not hitherto been noticed by any antiquarian. One of them offers the rudest specimen of coin in the whole collection, and another as good as any that has ever been issued by a Bengal Páṭhán. Ghyásuddín, son of Sikandar has five types and no less than fifteen different varieties.

"Of the other Bengal Páṭháns whose coins occur in this trove I have to notice Firuz Sháh the Abyssinian, who appears with the *prenomen* Shamsuddín instead of the commonly known Tájuddin, and Bahádur Sháh, who raised the standard of revolt in A. D. 1317, during the reign of the effeminate Mubárik, and for some years successfully maintained his independence. The time of Báhádur was occupied in organising and strengthening his newly-acquired principality, and he had little leisure to think of the design of his coin. He affords, therefore, a single type and a very indifferent specimen of Bengal rupee. Mr. Laidlay does not include this prince in his paper on the coins of the Páṭhán kings of Bengal, but his independence was complete, and I see no valid reason for excluding him. The number of his coins in the trove exceeds 200.

"The Delhi Páṭháns represented in this trove are Ghyásuddín Balban, Muázuddin Kaikobad, Jelláluddin Firuz, Aláuddin Muhammad Sikandar Sáni, Ghyásuddin Tughlak, Fakheruddin Mohammad

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and Mohammad Ádil Sháh. The total number of their coins does not exceed 150, or about one-fiftieth of the whole. There is only one type of each reign and of the earlier kings not more than two or three specimens each. The coins of Tughlak Sháh and Mohammad Ádil are of new types, the latest coin in the hoard is that of Ádil Sháh who ascended the throne of Delhi in 1552, and the hoard therefore must have been buried within a few years after that date, or about three hundred years ago. The number of Ádil Sháh's coins does not, however, exceed a couple: the great bulk of the hoard is made up of coins of the 13th and 14th centuries, it must therefore have been collected two centuries before it was buried.

"The following is the list of the different kinds of coins found in the trove:—

LIST.

Delhi Páṭháns.

1. Ghyásuddín Balban, A. D., 1266 to 1286, 10th King.
2. Müázuddín Kaikobád, 1286, 11th ditto.
3. Jelláluddin Firúz, 1288 to 1295, 12th ditto.
4. Alláuddin Muhammad Sikandar Sáni, 1295 to 1316, 14th ditto.
5. Ghyásuddin Tughlak Sháh (new type), 1321 to 1325, 18th ditto.
6. Fakheruddin Muhammad bin Tughlak, 1325 to 1351, 19th ditto.
7. Muhammad Ádil Sháh (new type), 1552 to 1553, 39th ditto.

Bengal Páṭháns.

Ghyásuddin Báhádur Shah, 1317 to 1322.

Fakheruddin Mubárik.

Shamsuddin Iliás Sháh Bangarah, small circle reverse, 1343 to 1358.

Ditto ditto, large ditto.

Ditto ditto, Square field obverse.

Sikandar Sháh bin Iliás, Rose field reverse, 1358 to 1367.

Ditto do., Hexagonal field reverse.

Ditto do., small circle reverse.

Ditto do., large do. do.

Ditto do., short legend, rude letters.

Ditto do., field on the obverse formed of a rose with 4 petals the margin having 4 circlets, the field on the reverse has an angular figure with 6 salient and 6 receding angles.

Ghyásuddin Ázam Sháh bin Sikandar, lozenge obverse, 1367 to 1373.

Ditto ditto, square ditto.

Ditto ditto, field on the obverse square having scalloped projections from the middle of each side, the reverse a rose of 4 petals.

Ditto ditto, square obverse, lotus reverse.

Ditto ditto, circular obverse and reverse.

Shamsuddin Firúz Sháh, A. D. 1491.

Bábu Rájendralála Mitra also exhibited a set of the Zodiacal rupees of Jehangir (except Scorpio and Aquarius) and a bacchanalian medal of that Emperor belonging to the collection of Colonel Guthrie. The rupees bear the Agra mint mark, and the same legend throughout, but their dates differ, Leo, Taurus, Gemini and Virgo being of 1028 H, Aries of 1030 H, Libra, Sagittarius, Capricornus and Pisces of 1031, and Cancer of 1033 H. Their excellent state of preservation and the fact of the figures of Aries, Taurus, Gemini, Libra, and Sagittarius, being unlike those to be met with on genuine Zodiacal rupees, but very similar to those of the Zodiacal Mohurs, suggest the idea of the rupees being forgeries, probably of the batch which is said to have been coined by General Claude Martin of Lucknow.

The medal was described as new, having an effigy of the Emperor seated in the centre and holding a decanter of wine in one hand and a cup lifted to his mouth in the other, with a legend round the margin. The reverse has on the field the figure of a lion *passant* with the sun rising behind it, and a legend on the margin. The figures represent the entrance of Sol into Scorpio and are emblematic of the birth of the Sovereign on a Sunday in the month of August. In its style of workmanship and state of preservation it is equal to the best specimen of Jehangir's coinage. Marsden in his *Numismata Orientalia* has a figure of a bacchanalian medal of the Emperor, but the legend in it is given on one side. He also alludes to a medal in the Collection of Mrs. Welland, which has the legend round the margin, but the wording of which appears to be different.

The word *ibn* in the legend, the Bábu said, was suspicious, inasmuch as it occurs in no other coin of Jehangir, but he accounted for it on the ground of exigency of the metre in which the legend was written. The bacchanalian character of the figure, he added, was in no way unbecoming a monarch who, in his autobiography, reckons the daily

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allowance of his drink at 25 glasses of double distilled arrack, however much the parade of such weakness was unbecoming in a Moslem.

The legend in the obverse is—

شبه شاه نور الدین جهانگیر ابن اکبر شاه
بروی سکهٔ زرداد چندین ذیب و زیور

Ditto on the reverse—

شاه نور الدین جهان گیر ابن اکبر بادشاه
زد میزر این سکه در اجمیر شاه دین پناه

The Honourable George Campbell observed that he would take advantage of the introduction of the subject of coinage to enquire, with reference to a statement in "Purchas," now under republication in the *Englishman* newspaper, that there was a coin in currency in the Mogul times called Seraffin, of the value of 10 Rupees, whether they might not be the origin of the English "Sovereign." He threw out the suggestion, merely as likely to lead to an interesting enquiry, and perhaps to show that recent financial measures have been anticipated so long ago as the time of Jehangir.

The following gentlemen duly proposed at the last meeting were balloted for, and elected ordinary members: J. Beames, Esq., C. S.; The Hon'ble E. Jackson; Baboo Tarruck Chunder Sircar; Captain E. B. Sladen, and R. Jardine, Esq., C. S.

The following gentlemen were named for ballot as ordinary members at the next Meeting:

Baboo Bhoodeb Mookerjee,—proposed by Baboo Gourdass Bysack, seconded by Mr. Heeley.

H. H. Locke, Esq., Principal of the Calcutta School of Art,—proposed by Mr. Heeley, seconded by Mr. H. F. Blanford.

The Hon'ble J. B. Phear,—proposed by Capt. Hyde, seconded by Mr. H. F. Blanford.

Col. W. D. Short,—proposed by Mr. Heeley, seconded by Mr. Geoghegan.

C. W. Hatton, Esq., proposed by Mr. Heeley,—seconded by Mr. H. F. Blanford.

The Council reported that the following gentlemen had been elected to the Committees.

Philol. Committee.—H. C. Sutherland, Esq.; Nat. Hist. Committee Baboo Debendro Mullick; Statistical Committee—C. B. Garrett, Esq.

They also reported that they had added a Durwan and a Ferash to the establishment of the Museum.

Communications were received—

1. From the Ven'ble J. H. Pratt, a letter on his paper entitled "on the degree of uncertainty which local attraction, if not allowed for, occasions in the map of a country, and in the mean figure of the earth as determined by Geodesy; a method of obtaining the mean figure free from ambiguity by a comparison of the Anglo-Gallic, Russian, and Indian Arcs; and speculations on the constitution of the earth's crust."

2. From Baboo Gopeenath Sen, an abstract of the hourly Meteorological Observations taken at the Surveyor General's Office in June last.

3. From H. B. Medlicott, Esq., a note relating to the Sivalik Fauna.

4. From Lieutenant Colonel E. T. Dalton, notes during a tour in 1863-64 in the Tributary Mehals, under the Commissioner of Chota-Nagpore, Bonai, Gangpore, Odeypore and Sirgooja.

5. From the Rev. F. Mason through Colonel Phayre, answers to the "queries for travellers" embracing Religion, Mythology and Astronomy among the Karens, with a vocabulary of eight dialects.

Mr. H. B. Medlicott read a notice referring to his description of the Sub-Himalayan rocks in the Memoirs of the Geological Survey of India, Vol. III. p. II. The deep unconformability between the upper and middle groups of those tertiary deposits had led him to question a statement that fossils had been found in the older groups, of the same kind as those in the true Sivalik beds. Sir Proby Cautley sets at rest the fact of fossils being found in the inner Zone; and re-affirms his opinion that they are the same as some of those from the Sivaliks. The inference, therefore, becomes very strong, that in the Fauna Sivalensis two separable stages have been confounded: the deep unconformability along the inner boundary suggests a far greater separation than could be surmised from the mere fact of succession as apparent in the outer section. As Colonel Cautley's collections from those special localities have been lost, the question must wait for fresh data.

Mr. Blanford made some observations on this paper.

A memorandum by Dr. Williams on the question of British Trade with Western China *viâ* Burmah was then read by the Secretary:—

Dr. Williams first touches upon the political state of the countries between the Bay of Bengal and Central China, and shows that the feelings of the Burmese Government with regard to the promotion of British enterprise had undergone a favourable change. After dealing with the condition of the Karen and Shan States, he explains the political position of the province of Yunan, where the rebel Government of the Pansee, or Chinese Mussulmans is now predominant; and he states that it appears to be the wish of that government to facilitate communication with the West. The Singpho or Kahkyan tribes stretching from North Assam round the North of Burmah to Western China have of late assumed practical independence with regard to their Burmese Suzerain, but also appear to be quite prepared to give a passage to traffic, on certain conditions of black mail.

The next subject is the physical character of the district, viewed with reference to the selection of a line of route for trade. The Salween is not navigable, and the formation of a road from Showgyeen to that river and along its valley to Mantungye, or across the hills to the Cambodia river, is rendered impassable by the steepness of the mountain passes which would have to be traversed. The route from Mandalay to Theinnee also contains one difficult and almost impossible ascent, although, this once overcome, there is an uninterrupted plain to the centre of Yunan. The ascent of the Irrawaddy above the capital is practicable to Bamo, for steam navigation, but the defile above Bamo would form an insuperable obstacle to further progress. East of Bamo, however, the range of hills, though not fully explored, appears to present fewer difficulties than in any other direction; and when once crossed, there is no obstacle to the construction of any kind of road or railroad. This, therefore, is the route which Dr. Williams recommends.

He then proceeds to enumerate the commercial advantages to be expected from this communication. Coal crops out in several places near the Upper Irrawaddy, and there are large deposits of magnetic oxide of iron, producing steel of first rate quality. The lead ore in one of the mountains is exceedingly rich in silver. English manufactures of the most inferior kind find a good market in Upper Burmah and among the Shans; and the trade might, with better roads, be indefinitely

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extended. Yunan itself with its ten millions of population is a most important district; it produces cotton, silk, and the finest tea. Sechuen, with a population of thirty millions, is at least of equal importance. Dr. Williams gives much detailed information respecting the products of these provinces, and the articles of British manufactures which are likely to find a market in Yunan.

He concludes by pointing out that the Bamo route, the ancient highway of trade between China and Burmah, is the route to which there are fewest objections, both for railroad and telegraphic communication; that even the construction of an ordinary road would immensely aid traffic, and that the revival of this traffic would be of immense advantage to China, Burmah and Britain, and to the cause of progress generally.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.829	29.896	29.764	0.132	81.7	92.2	74.6	17.6
2	.873	.939	.819	.120	84.5	94.0	78.0	16.0
3	*Sunday.*							
4	.822	.894	.751	.143	86.0	97.8	77.4	20.4
5	.801	.866	.724	.142	86.2	97.4	76.5	20.9
6	.751	.832	.667	.165	86.4	97.6	78.6	19.0
7	.702	.767	.624	.143	87.1	98.8	77.2	21.6
8	.717	.822	.623	.199	83.7	92.2	74.2	18.0
9	.739	.800	.680	.120	81.4	93.2	72.8	20.4
10	*Sunday.*							
11	.780	.845	.721	.124	85.7	96.4	77.5	18.9
12	.758	.845	.678	.167	87.1	99.8	78.0	21.8
13	.692	.780	.610	.170	88.5	101.2	78.6	22.6
14	.682	.735	.606	.129	84.8	96 8	77.6	19.2
15	.748	.890	.648	.242	80.1	88.4	75.6	12.8
16	.774	.855	.713	.142	82.4	92.8	73.8	19.0
17	*Sunday.*							
18	.749	.821	.671	.150	86.8	97.8	79.4	18.4
19	.704	.782	.635	.147	86.6	96.5	78.0	18.5
20	.708	.805	.638	.167	85.0	93.6	77.9	15.7
21	.731	.814	.659	.155	84.3	93.3	78.0	15.3
22	.769	.830	.716	.114	85.1	94.8	80.0	14.8
23	.804	.867	.748	.119	85.2	94.7	79.4	15.3
24	*Sunday.*							
25	.685	.764	.601	.163	87.7	98.6	80.2	18.4
26	.637	.731	.578	.153	90.5	103.6	80.2	23.4
27	.633	.708	.555	.153	89.3	101.6	81.0	20.6
28	.674	.739	.605	.134	87.6	98.0	80.0	18.0
29	.739	.813	.650	.163	86.5	94.8	78.2	16.6
30	.783	.844	.711	.133	83.9	94.8	74.2	20.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	75.4	6.3	71.0	10.7	0.751	8.07	3.30	0.71
2	78.1	6.4	73.6	10.9	.817	.73	.62	.71
3	*Sunday.*							
4	76.2	9.8	69.3	16.7	.711	7.56	5.35	.59
5	76.0	10.2	68.9	17.3	.701	.48	.51	.58
6	77.0	9.4	70.4	16.0	.736	.84	.22	.60
7	74.8	12.3	67.4	19.7	.668	.09	6.24	.53
8	71.4	12.3	62.8	20.9	.574	6.14	5.93	.51
9	73.5	7.9	68.0	13.4	.681	7.33	3.94	.65
10	*Sunday.*							
11	78.0	7.7	72.6	13.1	.790	8.43	4.37	.66
12	77.0	10.1	70.9	16.2	.748	7.97	5.36	.60
13	76.2	12.3	68.8	19.7	.699	.40	6.48	.53
14	72.8	12.0	64.4	20.4	.605	6.47	5.99	.52
15	71.8	8.3	66.0	14.1	.638	.88	3.96	.64
16	73.9	8.5	67.9	14.5	.679	7.28	4.33	.63
17	*Sunday.*							
18	78.0	8.8	72.7	14.1	.792	8.44	.77	.64
19	76.6	10.0	70.6	16.0	.741	7.89	5.25	.60
20	73.8	11.2	66.0	19 0	.638	6.81	.72	.54
21	76.9	7.4	71.7	12.6	.768	8.21	4.07	.67
22	78.0	7.1	73.0	12.1	.801	.55	.02	.68
23	78.5	6.7	73.8	11.4	.822	.78	3.83	.70
24	*Sunday.*							
25	80.2	7.5	75.7	12.0	.873	9.28	4.28	.68
26	74.4	16.1	64.7	25.8	.611	6.45	8.27	.44
27	79.1	10.2	73.0	16.3	.801	8.48	5.73	.60
28	79.7	7.9	75.0	12.6	.854	9.07	4.45	.67
29	78.7	7.8	74.0	12.5	.827	8.80	.30	.67
30	76 3	7.6	71.0	12.9	.751	.04	.09	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.749	29.863	29.605	0.258	80.3	83.8	74.0	9.8
1	.732	.855	.597	.258	80.0	83.2	73.7	9.5
2	.722	.849	.588	.261	79.6	83.6	73.5	10.1
3	.714	.845	.589	.256	79.0	83.0	73.2	9.8
4	.714	.850	.605	.245	78.8	82.8	72.8	10.0
5	.728	.861	.622	.239	78.5	82.0	73.2	8.8
6	.749	.872	.643	.229	78.3	81.6	73.8	7.8
7	.773	.898	.668	.230	79.3	82.6	74.8	7.8
8	.795	.904	.701	.203	82.7	87.0	76.4	10.6
9	.811	.925	.707	.218	85.5	90.0	77.2	12.8
10	.814	.939	.708	.231	88.5	95.4	78.0	17.4
11	.804	.931	.689	.242	91.0	99.6	76.4	23.2
Noon.	.781	.912	.663	.249	93.2	102.0	78.0	24.0
1	.754	.885	.632	.253	94.8	102.6	83.8	18.8
2	.728	.861	.603	.258	95.5	103.2	84.6	18.6
3	.700	.830	.581	.249	95.5	103.6	83.5	20.1
4	.679	.821	.556	.265	94.6	102.9	87.3	15.6
5	.678	.819	.555	.264	91.9	101.6	82.0	19.6
6	.685	.829	.568	.261	88.7	96.2	79.2	17.0
7	.703	.840	.578	.262	86.2	92.6	79.0	13.6
8	.726	.873	.620	.253	83.8	88.0	74.2	13.8
9	.744	.892	.635	.257	82.9	86.4	75.6	10.8
10	.755	.900	.649	.251	81.8	85.8	74.7	11.1
11	.752	.893	.640	.253	81.0	84.8	74.8	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Midnight.	75.5	4.8	72.1	8.2	0.778	8.39	2.52	0.77
1	75.2	4.8	71.8	8 2	.771	.31	.50	.77
2	74.9	4.7	71.6	8.0	.766	.27	.42	.77
3	74.7	4.3	71.7	7.3	.768	.31	.19	.79
4	74.4	4.4	71.3	7.5	.758	.20	.24	.79
5	74.2	4.3	71.2	7.3	.756	.18	.17	.79
6	74.1	4.2	71.2	7.1	.756	.18	.10	.80
7	74.8	4.5	71.6	7.7	.766	.27	.32	.78
8	76.0	6.7	71.3	11.4	.758	.15	3.57	.70
9	76.7	8.8	70.5	15.0	.739	7.89	4.83	.62
10	77.1	11.4	70.3	18.2	.734	.79	6.09	.56
11	77.4	13.6	69.2	21.8	.708	.47	7.46	.50
Noon.	77.6	15.6	68.2	25.0	.686	.21	8.69	.45
1	77.7	17.1	67.4	27.4	.668	.00	9.65	.42
2	77.9	17.6	67.3	28.2	.666	6.96	10.03	.41
3	77.6	17.9	66.9	28.6	.657	.87	.12	.40
4	77.8	16.8	67.7	26.9	.674	7.06	9.49	.43
5	77.3	14.6	68.5	23.4	.692	.30	8.02	.48
6	77.5	11.2	70.8	17.9	.746	.90	6.06	.57
7	76.6	9.6	69.9	16.3	.725	.72	5.27	.59
8	76.3	7.5	71.0	12.8	.751	8.04	4.06	.66
9	76.3	6.6	71.7	11.2	.768	.24	3.55	.70
10	76.1	5.7	72.1	9.7	.778	.36	.04	.73
11	75.7	5.3	72.0	9.0	.776	.35	2.79	.75

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
1	129.0	0.13	S.	8¾	Cloudless till 6 A. M. Scatd. ⌙i till 4 P. M. cloudy with thundering and raining at 5 P. M. cloudless afterwards.
2	140.0	...	S.	½	Cloudless till 2 A. M. Scatd. ⌙i & ∩i till 4 P. M. cloudless afterwards.
3	...	...	*Sunday.*	¼	
4	139.5	...	S. & W.	¼	Cloudless till 2 P. M. Scatd. \i till 6 P. M. cloudless afterwards.
5	142.0	...	E. & S.	0	Cloudless till 10 A. M. Scatd. \i & ⌙i till 6 P. M. cloudless afterwards also foggy at 6 & 7 A. M.
6	137.0	...	S. & N. W. & N.	0	Cloudless till 5 A. M. Scatd. ⌙i & ∩i till 4 P. M. cloudless afterwards.
7	145.0	...	W. & S. & S. W.	8¼	Cloudless till 1 P. M. cloudy afterwards, also thundering & lightning at 8 P. M. & drizzling at 10 P. M.
8	...	0.20	S. W. & S.	12¼	Cloudy; also thundering, lightning & raining at 8 & 9 P. M.
9	130.5	...	S.	1	Cloudy till noon; cloudless till 4 P. M. Scatd. ⌙i till 8 P. M. cloudless afterwards.
10	...	...	*Sunday.*	2¼	
11	134.4	...	S. & S. W.	0	Cloudless.
12	140.0	...	S. & S. W.	¾	Cloudless till 4 A. M. Scatd. ⌙i & \i afterwards.
13	142.0	...	S. & W.	¼	Cloudless.
14	131.4	...	S. & N. W. & W.	9	Cloudless till 4 A. M. Scatd. clouds afterwards; also thundering and drizzling at 5 P. M.
15	...	...	S. & W.	11	Cloudless till 6 A. M. cloudy till 3 P. M. Scatd. ⌙i after wards also slightly drizzling at 9 & 11 A. M.
16	132.4	...	S. & N.	¼	Cloudy till 7 A. M. Scatd. ⌙i & ∩i till 7 P. M. cloudless afterwards also slightly drizzling at 6 P. M.
17	...	...	*Sunday.*	0	
18	138.0	...	S. & W.	1½	Cloudless till 3 A. M. Scatd. clouds till 9 A. M. cloudless afterwards.
19	128.7	...	W. & S. W. & S.	½	Cloudless till 5 A. M. Scatd. ⌙i & \i till 11 A. M. cloudy till 6 P. M. Scatd. ⌙i afterwards.

\i Cirri, ⌙i Cirro strati, ∩i Cumuli, ⌒i Cumulo strati, ⌙i Nimbi, —i Strati, ⌙i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
20	...	...	S. & S. W.	4	Cloudy till 4 P. M. Scatd. ⌣i afterwards.
21	129.7	...	S. & S. W.	5	Scatd. ⌣i till 6 P. M. cloudless afterwards.
22	130.0	...	S. & S. W.	1	Cloudless till 5 A. M. Scatd. ⌣i & ⌢i till 8 P. M. cloudless afterwards; also thundering at 4 P. M.
23	138.4	..	S.	1	Cloudless till 6 A. M. Scatd. ⌢i till 3 P. M Scatd. ⌣i till 7 P. M. cloudless, afterwards.
24	...	...	*Sunday.*	2	
25	137.0	...	S.	1½	Cloudless.
26	136.8	...	S. & N. W. & S. E.	2½	Scatd. ⌣i till 3 A. M.; cloudless afterwards.
27	137.0	...	S.	¾	Cloudless till 3 A. M. cloudy till 8 A. M. cloudless afterwards; also hazy from 9 A. M. to 1 P. M.
28	133.0	...	S.	1¾	Cloudless.
29	131.0	...	S.	5½	Cloudy till 3 A. M. cloudless till 7 A. M. Scatd. ⌢i till 11 A. M. cloudless afterwards; also very slightly drizzling between 7 & 8 P. M.
30	126.0	0.78	S. & S. E.	12¾	Scatd. clouds till 9 A. M. Scatd. ⌣i till 3 P. M. cloudy afterwards also thundering, lightning and raining from 6 to 9 P. M.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.741
Max. height of the Barometer occurred at 10 A. M. on the 2nd, ..	29.939
Min. height of the Barometer occurred at 5 P. M. on the 27th, ..	29.555
Extreme range of the Barometer during the month, ...	0.384
Mean of the Daily Max. Pressures, ...	29.819
Ditto ditto Min. ditto, ...	29.669
Mean daily range of the Barometer during the month, ...	0.150

	°
Mean Dry Bulb Thermometer for the month, ...	85.6
Max. Temperature occurred at 3 P. M. on the 26th, ...	103.6
Min. Temperature occurred at 4 A. M. on the 9th, ...	72.8
Extreme range of the Temperature during the month, ...	30.8
Mean of the daily Max. Temperature, ...	96.2
Ditto ditto Min. ditto, ...	77.6
Mean daily range of the Temperature during the month, ...	18.6

	Inches
Mean Wet Bulb Thermometer for the month, ...	76.2
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	9.4
Computed Mean Dew-point for the month, ...	69.6
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	16.0
	Inches
Mean Elastic force of Vapour for the month, ...	0.717

	Troy grains
Mean Weight of Vapour for the month, ...	7.65
Additional Weight of Vapour required for complete saturation, ..	5.11
Mean degree of humidity for the month, complete saturation being unity,	0.60

	Inches
Rained 8 days, Max. fall of rain during 24 hours, ...	0.78
Total amount of rain during the month, ...	1.11
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	0.93
Prevailing direction of the Wind, ...	S.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of April, 1864.

Monthly Results.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	1						1		19		3		1						1
1	1						2		19		2		1		1				
2	2				1		2		17		2		1						1
3	1				2		3		17		2		1						
4	1				2		3		12		3								5
5	2						3		17		1		1						2
6	2				1		3		16		4								
7	2				1		2		13		4		4						
8	1						1		16		6		2						
9							1		14		6		5	1					
10	2								8		6		9		1				
11	2								9		5		8		2	1			
Noon.	1				1				9		7		6		2				
1	2						1		10		7		6						
2	2				1				7		9		6		1				
3					1		1		10		5		6		3				
4					1				10		7		3		4				1
5					1				14		5		2		4	2			
6					1		1		17	1	3		1		3				
7					1				20				2	1	3				
8	1	1			1		1		19	1	1		1	1	2				
9					3	2			20		2				1				
10					3				20		2	1					1		
11					3				21		2								

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	*Sunday.*							
2	29.691	29.790	29.593	0.197	84.2	95.0	74.6	20.4
3	.705	.762	.635	.127	86.1	94.4	80.6	13.8
4	.719	.788	.657	.131	86 6	95.3	80.6	14.7
5	.697	.762	.624	.138	86.9	97.0	80 4	16.6
6	.669	.719	.580	.139	86.8	98.0	77.6	20.4
7	.677	.734	.619	.115	87.0	98.8	77.8	21.0
8	*Sunday.*							
9	.776	.852	.709	.143	88.1	99.8	79.2	20.6
10	.812	.887	.767	.120	83.3	94.6	79.0	15.6
11	.838	.902	.756	.146	82.1	91.7	75.2	16.5
12	.846	.923	.771	.152	83.7	93.0	75.0	18.0
13	.827	.892	.765	.127	86.7	98.4	79.2	19.2
14	.798	.876	.704	.172	87.1	99.6	78.4	21.2
15	*Sunday.*							
16	.787	.881	.706	.175	82.9	94.0	73.8	20.2
17	.805	.883	.712	.171	82.8	93.6	73.0	20.6
18	.871	.947	.807	.140	79.9	92.0	74.0	18.0
19	.813	.892	.746	.146	81.6	93.6	74.2	19.4
20	.769	.851	.658	.193	83.8	94.0	74.7	19.3
21	.706	.763	.616	.147	87.0	98.2	79.0	19.2
22	*Sunday.*							
23	.663	.739	.580	.159	89.2	101.6	81.2	20.4
24	.582	.645	.500	.145	90.6	104.2	81.4	22.8
25	.583	.645	.533	.112	87.8	96.6	83.0	13.6
26	.647	.703	.602	.101	82.2	95.6	76.6	19.0
27	.686	.749	.614	.135	83.8	92.8	76.0	16 8
28	.686	.748	.596	.152	81.9	93.0	73.2	19.8
29	*Sunday.*							
30	.668	.720	.614	.106	77.2	83.0	74.6	8.4
31	.628	.695	.565	.130	79 9	86.4	75.0	11.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	*Sunday.*							
2	78.1	6.1	73.8	10.4	0.822	8.80	3.44	0 72
3	79.8	6.3	75.4	10.7	.865	9.22	.73	.71
4	80.5	6.1	76.8	9.8	.905	.63	.51	.73
5	80.0	6.9	75 9	11.0	.879	.36	.89	.71
6	79.2	7.6	74.6	12.2	.843	8.98	4.23	.68
7	76.5	10.5	70.2	16.8	.732	7.78	5.51	.59
8	*Sunday.*							
9	76.7	11.4	69.9	18.2	.725	.69	6 03	.56
10	76.0	7.3	70.9	12.4	.748	8.03	3.90	.67
11	73.1	9.0	66.8	15.3	.655	7.04	4.47	.61
12	74.9	8.8	68.7	15.0	.697	.46	.61	.62
13	77.3	9.4	71.7	15.0	.768	8.18	5.00	.62
14	77.5	9.6	71.7	15.4	.768	.18	.15	.61
15	*Sunday.*							
16	75.4	7.5	70.1	12.8	.729	7.82	3.97	.66
17	76.3	6.5	71.7	11.1	.768	8.24	.51	.70
18	75.1	4.8	71.7	8 2	.768	.30	2.48	.77
19	76.0	5.6	72 1	9.5	.778	.36	.98	.74
20	76 9	6.9	72.1	11.7	.778	.33	3.77	.69
21	78.9	8.1	74.0	13.0	.827	.80	4.49	.66
22	*Sunday.*							
23	81.1	8.1	76.2	13.0	.887	9.41	.75	.67
24	80.6	10.0	74.6	16.0	.843	8.91	5.85	.60
25	81.3	6.5	77.4	10.4	.922	9.81	3.79	.72
26	77.4	4.8	74.0	8.2	.827	8.90	2.64	.77
27	77.1	6.7	72.4	11.4	.785	.41	3.69	.70
28	77 2	4.7	73.9	8.0	.824	.87	2.57	.78
29	*Sunday.*							
30	74.8	2.4	73.1	4.1	.803	.72	1.23	.88
31	76.8	3.1	74.6	5.3	.843	9.11	.67	.85

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.733	29.862	29.572	0 290	80.0	85.2	73.8	11.4
1	.719	.828	.553	.275	79.9	84.6	74.0	10.6
2	.715	.841	.541	.300	79.5	84.4	74.6	9.8
3	.708	.853	.546	.307	79.4	84.0	75.0	9.0
4	.699	.857	.549	.308	79.5	83.8	74.0	9.8
5	.728	.872	.550	.322	78.9	83.6	74.0	9.6
6	.744	.893	.579	.314	79.2	84.0	74.0	10.0
7	.762	.915	.593	.322	80.4	85.2	75.2	10.0
8	.778	.930	.604	.326	83.3	86.8	77.8	9.0
9	.793	.937	.636	.301	85.7	89.4	79.3	10.1
10	.795	.947	.645	.302	88.4	93.2	79.8	13.4
11	.782	.939	.629	.310	90.5	97.4	77.6	19.8
Noon.	.765	.917	.611	.306	92.3	99.4	76.4	23.0
1	.741	.877	.586	.291	92.8	101.9	76.0	25.9
2	.711	.837	.562	.275	92.8	102.9	75.6	27.3
3	.682	.809	.531	.278	92.6	104.0	75.2	28.8
4	.665	.832	.506	.326	91.1	104.2	74.8	29.4
5	.664	.848	.500	.348	88.2	101.6	74.6	27.0
6	.675	.842	.501	.341	85.7	95.4	74.6	20.8
7	.694	.852	.524	.328	83.7	91.2	74.6	16.6
8	.714	.869	.545	.324	82.0	88.4	73.0	15.4
9	.730	.883	.555	.328	81.3	87.2	73.2	14.0
10	.746	.892	.571	.321	80.7	86.4	73.8	12.6
11	.738	.887	.582	.305	80.5	86.0	73.6	12.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Midnight.	76.3	3.7	73.7	6.3	0.819	8.85	1.96	0.82
1	76.5	3.4	74.1	5 8	.830	.96	.82	.83
2	76.2	3.3	73.9	5.6	.824	.90	.76	.84
3	76.2	3.2	74.0	5.4	.827	.95	.67	.84
4	76.3	3.2	74.1	5.4	.830	.98	.68	.84
5	75.8	3.1	73.6	5.3	.817	.84	.63	.84
6	76.1	3.1	73.9	5.3	.824	.92	.64	.85
7	76.8	3.6	74.3	6.1	.835	9.01	.93	.82
8	78.0	5.3	74.3	9.0	.835	8.96	2.97	.75
9	78.9	6 8	74.1	11.6	.830	.85	3.95	.69
10	79.4	9.0	74.0	14.4	.827	.79	5.05	.64
11	80.0	10.5	73.7	16.8	.819	.66	6.06	.59
Noon.	80.6	11.7	73.6	18.7	.817	.59	.91	.55
1	79.9	12.9	72.2	20.6	.781	.19	7.53	.52
2	79.4	13.4	71.4	21.4	.761	.00	.72	.51
3	79.2	13.4	71.2	21.4	.756	7.95	.68	.51
4	78.6	12.5	71.1	20.0	.753	.95	.02	.53
5	77.2	11.0	70.6	17.6	.741	.86	5.90	.57
6	76.9	8.8	70.7	15.0	.744	.93	4.87	.62
7	76.5	7.2	71.5	12.2	.763	8.18	3.89	.68
8	75.9	6.1	71.6	10.4	.766	.23	.24	.72
9	76.1	5.2	72.5	8.8	.787	.47	2.77	.75
10	76.1	4.6	72.9	7.8	.797	.59	.45	.78
11	76.2	4.3	73.2	7.3	.806	.70	.28	.79

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
1	...	...	*Sunday.*	3	
2	128.4	0.37	S.	17½	Cloudless till 3 A. M. cloudy till 9 A. M. Scatd. ∩i till 4 P. M. cloudy afterwards; also raining between 5 & 6 P. M.
3	140.0	...	S. & S. E.	2¼	Cloudless till 3 A. M. Scatd. clouds till noon, cloudless afterwards.
4	132.2	...	S.	2¼	Cloudless till 11 A. M. Scatd. ⌣i till 7 P. M. cloudless afterwards.
5	135.4	...	S.	3½	Cloudless till 4 A. M. Scatd. clouds till 9 A. M cloudless afterwards.
6	136.4	0.09	S.	4	Cloudless till 6 A. M. Scatd. ⌣i till 4 P. M. cloudy afterwards, also thundering and lightning from 9 to 11 P. M. & drizzling between 6 & 7 P. M. and at 10 & 11 P. M.
7	136.0	...	S. & S. W.	2	Cloudy till 11 A. M. Scatd. ⌣i till 7 P. M. cloudy afterwards; also drizzling from 9 to 11 P. M.
8	...	...	*Sunday.*	3	
9	139.9	...	S. & S. W.	1½	Cloudless till 2 P. M., cloudy afterwards.
10	125.0	0.18	S. & N. E. & E.	5	Scatd. ⌣i; also drizzling & thundering at 3 P. M.
11	128.4	...	N. E. & E. & S. E.	2	Overcast till 3 A. M. Scatd. ⌣i & ∩i till 3 P. M. cloudy afterwards, also thundering & lightning from 7 to 11 P. M. & drizzling at 7 P. M.
12	127.0	...	W. & S.	¼	Cloudless till 7 A. M. Scatd. ⌣i & ∩i till 5 P. M. cloudless afterwards, also lightning and drizzling at midnight.
13	140.0	...	S. & S. W.	4½	Cloudless till 3 A. M. Scatd. \i till 11 A. M. Scatd. ∩i till 3 P. M. cloudy till 8 P. M. cloudless afterwards; also drizzling & thundering at 6 P. M.
14	132.0	...	S.	½	Cloudless till 2 A. M. Scatd. ⌣i till 9 A. M. cloudless till 1 P. M. Scatd. clouds afterwards.
15	...	0.86	*Sunday.*	21¾	
16	130.0	...	S. E. & S. W. & S.	0	Scatd. clouds; also thundering and lightning at 8 & 9 P. M.

\i Cirri, ⌣i Cirro strati, ∩i Cumuli, ∩i Cumulo strati, ⌣i Nimbi, —i Strati, ⌣ i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
17	124.0	2.60	S.	15	Cloudless till 5 A. M. Scatd. clouds till 1 P. M. cloudy afterwards; also thundering and lightning from 5 to 11 P. M. and raining at 3 P. M. and from 7 to 11 P. M.
18	120.0	0.72	S. E. & N. E.	¼	Cloudy till 3 A. M. Scatd. ⌣i till noon, cloudy afterwards also raining at midnight and 1 A. M. & at 3, 4 and 11 P. M.
19	119.4	0.48	S. E. & S. & S. W.	9	Scatd. ⌣i & ⌒i till 3 P. M. cloudy afterwards, also raining at midnight and at 5 & 6 P. M.
20	119.0	...	S. & S. W.	5¼	Cloudless till noon, Scatd. ⌣i and ⌒i till 6 P. M. cloudy afterwards, also thundering & lightning at 7 P. M.
21	136.0	...	S. & S. W.	2	Cloudless till 5 A. M. Scatd. ⌣i till 10 A. M. cloudless till 2 P. M. Scatd. clouds afterwards.
22	...	0.28	*Sunday.*	9	
23	144.0	...	S.	0	Cloudless.
24	144.4	...	S. & S. W.	1	Cloudless.
25	132.0	...	S.	5¼	Cloudless till 3 A. M. Scatd. clouds till 3 P. M. cloudy afterwards also slightly drizzling at 5 P. M.
26	...	0.18	S. E. & S. & E.	25	Cloudy; also drizzling occasionally from 1 to 9 P. M. & lightning from 7 to 9 P. M.
27	133.3	...	S.	0	Scatd. ⌣i till 3 A. M. cloudy till noon Scatd. ⌣i afterwards.
28	118.0	1.36	S. & S. E.	4¾	Cloudy; also raining constantly, from 11 A. M. to 11 P. M. & thundering & lightning from 6 to 9 P. M.
29	...	0.14	*Sunday.*	1½	
30	...	3.10	S. & E.	3	Cloudy; also raining and thundering from 9 A. M. to 2 P. M.
31	...	...	S. E &. S.	¼	Cloudy; also drizzling at 10 A. M. & at 5 & 6 P. M.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Monthly Results.

		Inches
Mean height of the Barometer for the month, ...		29.729
Max. height of the Barometer occurred at 10 A. M. on the 18th, ..		29.947
Min. height of the Barometer occurred at 5 P. M. on the 24th, ..		29.500
Extreme range of the Barometer during the month, ...		0.447
Mean of the Daily Max. Pressures, ...		29.798
Ditto ditto Min. ditto, ...		29.655
Mean daily range of the Barometer during the month, ...		0.143
		o
Mean Dry Bulb Thermometer for the month, ...		84.6
Max. Temperature occurred at 4 P. M. on the 24th, ...		104.2
Min. Temperature occurred at 8 P. M. on the 17th, ...		73.0
Extreme range of the Temperature during the month, ...		31.2
Mean of the daily Max. Temperature, ...		95.2
Ditto ditto Min. ditto, ...		77.2
Mean daily range of the Temperature during the month, ...		18.0
Mean Wet Bulb Thermometer for the month, ...		77.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..		7.1
Computed Mean Dew-point for the month, ...		72.5
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..		12.1
		Inches
Mean Elastic force of Vapour for the month, ...		0.787
		Troy grains
Mean Weight of Vapour for the month, ...		8.42
Additional Weight of Vapour required for complete saturation, ..		3.97
Mean degree of humidity for the month, complete saturation being unity,		0.68
		Inches
Rained 18 days, Max. fall of rain during 24 hours, ...		3.10
Total amount of rain during the month, ...		10.36
Prevailing direction of the Wind, ...	S. & S. E.	

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	1				4		2	1	17	1			1	1			1		
1	1		1		6		6	1	12										
2	1		1		6		5		12										1
3	1		1		3		10		9										2
4	1		1		2		8		9						1				4
5	2				2		5		13		2				1				1
6	1		1		4	1	4		13		2		1						
7			2		3		5		14		1		1						
8			1		1		3		18		3								
9			2				2		15		6		1	1					
10					1		1		15	1	6	1	2		1				
11			2	1	1		3		13	1	6		1						
Noon.			1				4	1	13		6		2						
1			2		2		1	1	15	1	4		1		1	1			
2			2		2				16	2	4	1	1		1	1			
3			2	2			2		16	1	5		1						
4	1		1	1	1		2		15		5		1						
5	1		2				5	2	12	1	6								
6	1				3	2	5	1	9		6	1			1	1	1		
7	2	1			2	1	5	3	11		4						1		1
8					3		6	3	10		5						2		
9	1	1			2		6	2	13	1	3		1						
10					1	1	6	2	14	1	2		1						2
11					1		5	2	17	3	2		1						

On the 26th May, the wind which had been blowing steadily from S., and by E. suddenly veered round at 12*h*. 30*m*. to N. W. blowing very strongly, and in heavy gusts varying in pressure from 3 to 25lbs per square foot till 2*h*. 15*m*. P. M. when it became calm, having veered during the interval by W. to S. W. About 3*h*. 30*m*. the wind again changed suddenly from S. W. to N. and by E. and subsequently to E. and by N. The gale was accompanied by a good deal of thunder and lightning and a little rain. The ten minutes observations taken during the gale show that at Noon the Barometer stood at 29.79 Inches at 12*h*. 30*m*., the moment of the first sudden change of wind, and commencement of gale, it rose to 29.83 Inches and then fell gradually and continuously to 29.738 Inches at 5 P. M. At 8 P. M. it again rose to 29.832 Inches.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11. Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.574	29.633	29.493	0.140	85.2	91.9	79.4	12.5
2	.507	.563	.447	.116	85.9	93 0	78.4	14.6
3	.511	.555	.455	.100	86 7	95.0	79.2	15.8
4	.539	.601	.465	.136	88.4	97.4	80.6	16.8
5	*Sunday.*							
6	.584	.641	.493	.148	88.3	94.6	82.8	11.8
7	.588	.650	.525	.125	85.8	94.4	82 8	11.6
8	.578	.628	.512	.116	87.8	94.6	81.8	12.8
9	.559	.614	.480	.134	87.9	96.6	76 6	20.0
10	.558	.628	.471	.157	85.8	93.6	78.0	15.6
11	.547	.603	.488	.115	80.5	86.2	77.6	8.6
12	*Sunday.*							
13	.531	.605	.448	.157	87.0	96.4	82.0	14.4
14	.587	.630	.540	.090	84.5	90.2	80.8	9.4
15	.580	.627	.538	.089	83.5	88.8	80.0	8.8
16	.541	.596	.488	.108	84.1	90.6	78.0	12.6
17	.487	.552	.429	.123	86 1	94.2	79.8	14.4
18	.535	.593	.482	.111	85.8	89.0	81.4	7.6
19	*Sunday.*							
20	.617	.672	.517	.155	84.9	92.2	76.0	16.2
21	.580	.630	.523	.107	95.9	92.8	78.0	14.8
22	.546	.592	.473	.119	88.6	95.8	83.8	12.0
23	.524	.554	.468	.086	89.5	96.2	84.2	12.0
24	.548	.577	.506	.071	85.5	93.4	80.8	12.6
25	.535	.572	.484	.088	86.7	94.4	79.6	14.8
26	*Sunday.*							
27	.565	.611	.512	.099	86.8	92.6	83.6	9.0
28	.523	.569	.470	.099	81.4	83.6	80.0	3.6
29	.514	.576	.473	.103	79.3	82.8	76.8	6.0
30	.495	.536	.447	.089	81.1	85.8	75.0	10.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly Observations made during the day.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79.9	5.3	76.2	9.0	0.887	9.49	3.12	0 75
2	80.2	5.7	76.2	9.7	.887	.47	.40	.74
3	81.3	5.4	78.1	8.6	.943	10.04	.14	.76
4	83.2	5.2	80.1	8.3	1.005	.67	.17	.77
5	*Sunday.*							
6	81.9	6.4	78.1	10.2	0.943	.02	.78	.73
7	80.4	5.4	76.6	9.2	.899	9.59	.24	.75
8	81.9	5.9	78.4	9.4	.952	10.12	.48	.74
9	81.6	6.3	77.8	10.1	.934	9.93	.71	.73
10	80.4	5.4	76.6	9.2	.899	.59	.24	.75
11	76.4	4.1	73.5	7.0	.814	8.78	2.20	.80
12	*Sunday.*							
13	81.5	5.5	78.2	8.8	.946	10.07	3.22	.76
14	80.2	4.3	77.2	7.3	.916	9.81	2.54	.79
15	79.2	4.3	76.2	7 3	.887	.52	.48	.79
16	79.6	4.5	76.4	7.7	.893	.56	.65	.78
17	81.2	4.9	77 8	8.3	.934	.97	.98	.77
18	81.5	4.3	78.5	7.3	.955	10.21	.62	.80
19	*Sunday.*							
20	80.8	4.1	77.9	7.0	.937	.02	.47	.80
21	81.9	4.0	79.1	6.8	.973	.38	.49	.81
22	83.8	4.8	80.9	7.7	1.030	.92	3.00	.78
23	84.4	5.1	81.3	8.2	.043	11.06	.23	.77
24	81.1	4.4	78.0	7.5	0.940	10.03	2.69	.79
25	81.0	5.7	77.6	9.1	.928	9.89	3.29	.75
26	*Sunday.*							
27	82.2	4.6	79.4	7.4	.983	10.47	2.74	.79
28	78.8	2.6	77.0	4.4	.910	9.81	1.46	.87
29	76.8	2.5	75.0	4.3	.854	.24	.35	.87
30	78.6	2.5	76.8	4.3	.905	.75	.42	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.561	29.641	29.498	0.143	82.6	86.0	77.0	9.0
1	.552	.628	.476	.152	82.2	85.4	77.0	8.4
2	.544	.623	.464	.159	82.0	85.0	75.0	10.0
3	.536	.614	.469	.145	81.5	84.6	76.0	8.6
4	.539	.601	.455	.146	81.5	85.0	76.0	9.0
5	.544	.600	.478	.122	81.4	84.6	76.4	8.2
6	.560	.637	.498	.139	81.7	84.8	77.0	7.8
7	.572	.657	.515	.142	82.5	86.6	77.8	8.8
8	.585	.672	.530	.142	84.4	88.5	78.2	10.3
9	.591	.671	.525	.146	86.6	90.8	77.2	13.6
10	.590	.668	.519	.149	88.0	92.8	77.8	15.0
11	.581	.644	.516	.128	89.2	94.6	78.0	16.6
Noon.	.564	.626	.502	.124	90.2	95.8	79.6	16.2
1	.546	.606	.473	.133	90.7	96.6	79.2	17.4
2	.528	.579	.464	.115	91.0	97.4	78.6	18.8
3	.510	.569	.434	.135	90.4	96.2	80.0	16.2
4	.495	.552	.429	.123	89.7	95.2	81.0	14.2
5	.493	.572	.445	.127	88.8	94.0	81.4	12.6
6	.501	.639	.447	.192	87.4	92.3	81.4	10.9
7	.518	.612	.445	.167	85.5	89.7	76.0	13.7
8	.541	.618	.465	.153	84.5	88.4	76.8	11.6
9	.559	.634	.486	.148	83.6	87.5	78.0	9.5
10	.574	.628	.511	.117	82.8	86.8	77.0	9.8
11	.468	.614	.510	.104	82.1	86.0	76.6	9.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.6	3.0	77.5	5.1	0.925	9.94	1.74	0.85
1	79.1	3.1	76.9	5.3	.908	.76	.78	.85
2	78.9	3.1	76 7	5.3	.902	.70	.77	.85
3	78.6	2.9	76.6	4.9	.899	.67	.64	.86
4	78.8	2.7	76.9	4.6	.908	.76	.55	.86
5	78.7	2 7	76.8	4.6	.905	.73	.54	.86
6	78.9	2.8	76.9	4.8	.908	.76	.61	.86
7	79.5	3.0	77.4	5.1	.922	.91	.73	.85
8	80.5	3.9	77.8	6.6	.934	.99	2.32	.81
9	81.6	5 0	78.6	8.0	.958	10.21	.93	.78
10	82.5	5.5	79.2	8.8	.976	.37	3.31	.76
11	82.3	6.0	79.6	9.6	.989	.48	.68	.74
Noon.	83.3	6.9	79.2	11.0	.976	.33	4.26	.71
1	83.2	7.5	78.7	12.0	.961	.16	.64	.69
2	83.0	8.0	78.2	12.8	.946	9.98	.95	.67
3	82.7	7.7	78.1	12.3	.943	.97	.70	.68
4	82.5	7.2	78.2	11.5	.946	10.00	.37	.70
5	82.1	6.7	78.1	10.7	.943	.00	.00	.71
6	81.7	5.7	78.3	9.1	.919	.09	3.36	.75
7	80.7	4.8	77.3	8.2	.919	9.82	2.90	.77
8	80.3	4.2	77.4	7.1	.922	.87	.48	.80
9	79.7	3.9	77.0	6.6	.910	.75	.28	.81
10	79.1	3.4	77.0	5.8	.910	.77	1.98	.83
11	78.9	3.2	76.7	5.4	.902	.70	.81	.84

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches		lbs	
1	130.0	...	S. & Calm.	0	Scatd. clouds.
2	144.0	0.20	S.	0	Cloudless till 7 A. M.; Scatd. clouds till 8 P. M. cloudy and lightning afterwards also raining at 11 P. M.
3	136.0	0.11	S. & S. W.	½	Cloudy till 10 A. M. Scatd. ⌙i till 3 P. M. cloudy afterwards; also lightning at 8 P. M. and raining between 6 & 7 A. M.
4	133.0	...	S.	4	Scatd. \i and ⌙i till 4 P. M. cloudy afterwards also lightning at 8 & 9 P. M. and drizzling at 11 P. M.
5	...	...	*Sunday.*	1	
6	135.0	...	S.	1	Scatd. \i & ⌙i till 7 P. M. clouldless afterwards.
7	121.0	...	S. & S. E.	1	Cloudless till 6 A. M. Scatd. ⌙i and ⌒i afterwards.
8	127.2	...	S. & S. W.	¾	Cloudless till 5 A. M. Scatd. clouds till 7 P. M. cloudless afterwards.
9	134.0	0.62	S.	7	Cloudless till 2 A. M. Scatd. ⌙i till 7 P. M. overcast afterwards; also raining from 9 to 11 P. M.
10	127.4	2.16	S.	6	Scatd. clouds till 5 A. M. Scatd. ⌙i till 7 P. M. cloudy afterwards; also raining at 10 & 11 P. M.
11	...	1.10	S.	1½	Cloudy; also raining from midnight to 2 A. M. and from noon to 2 P. M.
12	...	...	*Sunday.*	¼	
13	138.0	...	S. & S. E.	1¾	Scatd. clouds till 6 A. M. Scatd. ⌙i afterwards.
14	...	...	S. E &. S.	¼	Scatd. ⌙i & \i till 8 A. M. cloudy afterwards.
15	...	...	S. & S. E.	0	Cloudy till 6 P. M. Scatd. \i & ⌙i afterwards also drizzling at 11 A. M.
16	...	...	S.	½	Cloudy; also slightly drizzling at 5 A. M. & 9 P. M.
17	130.4	...	S. & W.	¾	Cloudy till 8 A. M. Scatd. ⌒i & ⌙i till 2 P. M. cloudy afterwards; also drizzling at midnight and 1 A. M.
18	...	...	S. & S. E.	1	Cloudy.
19	...	1.53	*Sunday.*	13½	

\i Cirri,—i Strati, ⌒i Cumuli, ⌙i Cirro strati, ⌒i Cumulo strati, ⌙i Nimbi, ⌙ i Cirro cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
20	126.7	1.56	S.	8	Cloudy till 9 A. M. Scatd. ⌒i till 4 P M. cloudy afterwards; also raining from 7 to 11 P. M. and thundering and lightning at 7 & 8 P. M.
21	118.0	...	S.	1¼	Cloudy also thundering and lightning at 10 & 11 A. M.
22	134.9	...	S. & S. E.	1	Cloudy till 9 A. M. Scatd. clouds afterwards
23	127.0	...	S. & S. E.	2¼	Scatd. ⌣i till 11 A. M. Scatd. ⌒i afterwards.
24	...	...	S. & S. E.	1¼	Cloudy till 7 P. M. cloudless afterwards.
25	132.0	...	S. & S. E.	1	Scatd. ⌣i & ⌒i till 7 P. M. cloudless afterwards also drizzling at 7 P. M.
26	...	...	*Sunday.*	¾	
27	118.5	...	S. & S. E. & calm.	1	Cloudy nearly the whole day; also drizzling at 4 & 5 P. M.
28	...	2.47	W. & S. W. & S. E.	4	Cloudy; also incessantly raining from 8 A. M. to 11 P. M. and thundering at 2 P. M.
29	...	1.92	S. W. & W.	3¼	Cloudy; also raining nearly the whole day.
30	...	7.06	S. & S. E.	8	Cloudy; also raining nearly the whole day and thundering and lightning from 1 to 4 A. M.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.548
Max. height of the Barometer occurred at 8 A. M. on the 20th, ..	29.672
Min. height of the Barometer occurred at 4 P. M. on the 17th, ..	29.429
Extreme range of the Barometer during the month, ...	0.243
Mean of the Daily Max. Pressures,..	29.600
Ditto ditto Min. ditto, ...	29.486
Mean daily range of the Barometer during the month, ...	0.114
	o
Mean Dry Bulb Thermometer for the month, ...	85.5
Max. Temperature occurred at 2 P. M. on the 4th, ...	97.4
Min. Temperature occurred at 2 A. M. on the 30th, ...	75.0
Extreme range of the Temperature during the month, ...	22.4
Mean of the daily Max. Temperature, ...	92.2
Ditto ditto Min. ditto, ...	79.9
Mean daily range of the Temperature during the month, ...	12.3
Mean Wet Bulb Thermometer for the month, ...	80.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	4.7
Computed Mean Dew-point for the month, ...	77.5
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	8.0
	Inches
Mean Elastic force of Vapour for the month, ...	0.925
	Troy grains
Mean Weight of Vapour for the month, ...	9.88
Additional Weight of Vapour required for complete saturation, ..	2.84
Mean degree of humidity for the month, complete saturation being unity,	0.78
	Inches
Rained 16 days, Max. fall of rain during 24 hours, ...	7.06
Total amount of rain during the month, ...	18.73
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	17.93
Prevailing direction of the Wind, ...	S. & S. E.

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Gangaroowa near Kandy, Ceylon.

September, 1863.	GENERAL REMARKS.
1	Mild to warm and pleasant, Light showers.
2	Mild to warm and pleasant, showers afternoon and all even.
3	Mild to warm and pleasant, very light showers.
4	Mild and damp; showers at night, all morn and all noon.
5	Mild to warm, pleasant, rather damp; showery.
6	Mild to warm, pleasant; cloudy but fine.
7	Mild to warm, pleasant; cloudy but fine.
8	Mild to warm, pleasant; high clouds, clear at night.
9	Mild to very warm, fresh and pleasant; clear and cool all night.
10	Mild to very warm, fresh and pleasant; cloudy.
11	Mild to hot, pleasant; light rain afternoon, clear night.
12	Mild to hot, pleasant; a little rain in after even.
13	Mild to hot, till noon; rain afternoon and all even.
14	Mild to warm, pleasant; showery.
15	Mild to warm, damp but pleasant; showers.
16	Mild to warm, damp; frequent light showers.
17	Mild to warm, damp; frequent light showers.
18	Mild to warm, damp; frequent light showers.
19	Mild to warm, pleasant; some light showers.
20	Mild to warm, pleasant; cloudy but fine.
21	Mild to warm, pleasant; a little rain.
22	Mild to warm, pleasant; cloudy, fine.
23	Mild to warm, pleasant; clouds, mostly high.
24	Rain at night; fine, dry, fresh day.
25	Cloudy, fine dry and pleasant.
26	Mild to warm, pleasant; showery till 3. p. m. fine after.
27	Fine, dry and fresh day.
28	Mild to warm, at times raw and damp; showers.
29	Mild to hot, fresh; clouds mostly high; cool after even.
30	Mild to hot, fresh; clouds mostly high; cool after even.
	Solar Halos on 6th, 10th, 19th, 20th, 21st, 28th. Lunar Halos on 20th, 26th, 27th, 29th.

Meteorological Observations taken at Gangaroowa near Kandy, Ceylon, in the month of September, 1863.

Alt. 1560 ft.; E. Long. 80° 37′, N. Lat. 7° 17′.

All the Instruments (excepting the Max. for the Air, and Min. for the Grass) have been compared with standards.

The tension of aqueous vapour, from which are deduced the pressure of dry air, the dew point and humidity, has been found by the formula $f = f' - \frac{d}{88} \times \frac{h}{30}$ given in Mr. Drew's "Practical Meteorology," (Ed. 1855) and the tables therein given.

The dew is the weight in grains deposited on a square foot of ordinary woollen cloth exposed on a board from 6 P. M. to 6 A. M. or for as many hours as there is no rain.

The rain gauge is 4½ feet above the ground.

The ozone cage is hung about 25 feet above the ground.

The direction of the wind given is that of the lowest current by the vane, and of the currents above this by the direction in which the Nimbi and Cumulo-Strati clouds are moving.

In this column a "calm" signifies that the clouds are apparently motionless: "variable," that the clouds apparently in the same or nearly the same stratum move in no fixed direction, but their parts move as if in vortices, or different masses of them move up from different quarters as if into a vast vortex, this being nearly always the case before thunder storms.

Entries, such as W S W and N N W or $\frac{\text{W S W}}{\text{N N W and calm,}}$ signify that the clouds are evidently in strata of different altitudes, that those in the lowest stratum move from W. S. W. those in the next higher from N. N. W.; those in the next are apparently becalmed, and so on.

The velocity and distance in 24 hours are given by Robinson's Anemometer.

In the column for Lightning and Thunder

L = "Lightning" when the flash is near enough to be visible.

L R = "Lightning Reflection" when the flash is so distant that only its reflection on the clouds or in the air is visible.

"Morn," is 6 A. M., "Even," 6 P. M. and "Night," 12 P. M. and "fore" and "after" are prefixed to these, as ordinarily to "Noon," to denote the 3 previous and 3 following hours.

R. H. Barnes.

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Gangaroowa near Kandy, Ceylon.

November, 1863.	Barometer reduced to 32°.			Pressure of Dry Air.			Thermometer.			Dew Point.		
	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0
1	28.329	28.198	28.325	27.603	27.433	27.623	76.0	78.4	71.7	70.0	71.6	68.9
2	.315	.215	.305	.553	.423	.594	76.0	75.9	70.6	71.4	72.6	69.3
3	.332	.227	.333	.576	.448	.664	75.9	75.1	68.5	71.2	72.1	67.5
4	.362	.254	.367	.633	.492	.669	73.7	75.0	70.2	70.1	71.4	68.7
5	.338	.228	.320	.629	.459	.613	73.3	74.0	70.3	69.2	71.7	69.1
6	.317	.208	.326	.596	.500	.686	74.1	76.7	67.9	69.8	69.2	66.1
7	.340	.234	„	.687	.521	„	73.1	76.6	„	66.7	69.4	„
8	.373	.256	.378	.718	.510	.645	74.2	78.5	72.0	66.8	70.8	70.3
9	.359	.251	.372	.630	.503	.621	75.0	78.0	73.0	70.1	70.9	71.0
10	.361	.252	.383	.688	.557	.653	75.7	78.6	72.3	67.6	68.6	70.1
11	.389	.270	.381	.772	.546	.710	76.5	79.5	73.3	65.0	69.9	67.6
12	.382	.270	.371	.661	.598	.676	76.1	79.4	70.8	69.7	67.6	68.6
13	.360	.272	.382	.678	.551	.686	76.1	79.1	71.0	68.1	69.8	68.7
14	.346	.237	.344	.599	.481	.600	77.0	81.0	73.0	70.8	71.2	70.7
15	.372	.250	.335	.728	.544	.637	76.5	80.2	71.1	66.3	69.1	68.8
16	.354	.233	.342	.636	.453	.621	77.2	76.3	72.8	69.6	72.2	69.7
17	.343	.232	.350	.643	.461	.649	75.1	74.5	70.2	68.8	71.8	68.9
18	.359	.272	.370	.585	.553	.730	75.5	72.7	67.3	71.9	69.6	66.1
19	.389	.295	.408	.665	.544	.716	74.5	73.0	69.5	69.9	71.0	68.5
20	.388	.263	.390	.660	.543	.721	75.1	76.6	71.9	70.1	69.7	67.5
21	.400	.248	.393	.709	.486	.746	75.9	77.3	68.1	68.4	71.5	66.4
22	.411	.285	.410	.749	.572	.721	76.0	76.5	72.0	67.2	69.4	68.3
23	.417	.292	.398	.716	.605	.747	77.0	78.0	73.0	68.9	68.2	66.6
24	.422	.304	.411	.824	.571	.721	76.0	79.0	71.2	64.1	70.3	68.4
25	.403	.283	.402	.735	.501	.682	77.1	76.5	70.7	67.4	72.2	69.7
26	.383	.253	.355	.672	.494	.643	73.8	77.6	70.8	69.3	71.3	69.3
27	.353	.246	.353	.658	.494	.753	75.9	77.9	73.1	68.6	71.0	64.1
28	.352	.257	.376	.662	.545	.827	75.7	78.0	69.3	68.4	69.3	61.5
29	.372	.253	.349	.864	.542	.690	67.9	75.1	70.0	59.1	69.3	67.0
30	.326	.249	.308	.572	.528	.623	75.0	72.5	69.8	71.1	69.7	68.2
	28.365	28.253	28.363	27.670	27.515	27.678	75.2	76.9	70.9	68.5	70.4	68.1

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Gangaroowa near Kandy, Ceylon.

Humidity.			In Sun's Rays at 12 o'clock.	Minimum on the Grass.	Maximum in Air.	Minimum in Air.	Difference.	Mean.	Dew.	Rain.		
A. M. 9.30	P. M. 3.30	P. M. 10.0								A. M. 9.30	P. M. 10.0	Total.
823	804	913	130.7	66.2	78.8	68.9	9.9	73.9	380	0.000	0.000	0.000
864	901	958	124.0	63 3	79.0	67.3	11.7	73.2	315	0.000	0.299	0.299
859	909	966	126.0	66.6	79.9	69.3	10.6	74.6	313	0.000	2.311	2.311
890	892	954	128.8	63.0	77.0	66.1	10.9	71.5	330	0.000	0.023	0.023
876	930	963	116.0	66.5	75.7	67.1	8.6	71.4	0	0.110	0.254	0.364
869	785	974	128.6	66.0	76.9	65.8	11.1	71.4	211	0.000	0.000	0.000
813	793	„	133.0	58.6	77.0	62.7	14.3	69.8	546	0.000	0.000	0.000
787	781	945	123.0	60.6	78.4	63.8	14.6	71.1	394	0.000	0.000	0.000
854	795	937	140.0	61.4	79.0	67.6	11.4	73.3	253	0.000	0.000	0.000
770	725	932	„	63.3	79.2	67.7	11.5	73.5	299	0.000	0.005	0.005
688	735	830	141 3	59.7	79.8	65.8	14.0	72.8	200	0.000	0 000	0.000
815	684	931	141.0	61.2	79.8	67.4	12.4	73.6	274	0.000	0.000	0.000
771	741	927	„	60.0	80.2	64.8	15.4	72.5	291	0.000	0.000	0.000
821	731	929	145.6	63.6	81.3	68.8	12.5	75.0	188	0.000	0.000	0.000
718	701	927	139.5	58.4	81.1	65.2	15.9	73.2	366	0.000	0.000	0.000
783	876	906	128.2	63.5	80.1	68.3	11.8	74.2	193	0.000	0.115	0.115
817	917	958	93.8	63.3	77.4	68.7	8.7	73.0	204	0.000	1.514	1.514
892	906	961	133.0	68.0	78.7	68.3	10.4	73.5	0	0.055	1.456	1.511
862	938	967	127.3	61.3	78.2	64.8	13.4	71.5	247	0.000	0.201	0.201
850	801	865	120.0	65.2	78.2	67.2	11.0	72.7	329	0.000	0.029	0.029
786	829	940	134.5	61.0	78.5	64.1	14.4	71.3	409	0.000	0.001	0.001
756	796	887	128.0	56.7	78.5	63.2	15.3	70.9	469	0.000	0.015	0.015
770	731	812	116.0	65.7	78.4	70.0	8.4	74.2	99	0.000	0.000	0.000
678	756	913	138.3	59.8	80.2	66.1	14.1	73.1	293	0.000	0.000	0.000
732	873	967	142.6	61.0	80.0	67.0	13.0	73.5	204	0.000	0.526	0.526
865	818	954	124.2	60.2	77.7	65.1	12.6	71.4	248	0.000	0.105	0.105
790	803	747	125.0	64.3	79.1	68.8	10.3	74.0	108	0.014	0.002	0.016
790	757	773	130.0	60.3	78.5	66.7	11.8	72.6	236	0.000	0.001	0.001
748	829	907	134.0	50.0	75.9	58.3	17.6	67.1	345	0.000	0.000	0.000
883	915	949	102.7	65.2	75.8	68.5	7.3	72.1	0	0.001	0.652	0.653
808	815	917	128.4	62.1	78.6	66.4	12.2	72.5	7744	0.180	7.509	7.689

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Gangaroowa near Kandy, Ceylon.

	A. M. 9.30							P. M. 3.30						
November, 1863.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.
1	1.7	0	5.8	0	1.5	0	9.0	8.8	0	0	0	1.0	0	9.8
2	2.0	0	3.5	0	2.0	0	7.5	0	0	0	0	0	10.0	10.0
3	2.0	0	0	0	4.0	0	6.0	0	0	0	0	0	10.0	10.0
4	0.6	0	8.4	0	1.0	0	10.0	0	7.6	0.8	0	0.1	1.5	10.0
5	0	0	0	0	0	10.0	10.0	0	0	0	0	0	10.0	10.0
6	4.5	0	0.1	0	S	0	4.6	1.5	0	7.2	0	0.8	0	9.5
7	1.0	0	0	0	S	0	1.0	9.0	0	0	0	0.1	0	9.1
8	0.3	0	0	0	0.3	0	0.6	0.3	0	0	0	0.5	0	0.8
9	1.2	0	0	0	3.3	0	4.5	0.6	0	0	0	0.6	0	1.2
10	9.0	0	0	0	S	0	9.0	2.5	0	0	0	0.6	0	3.1
11	8.6	0	0	0	0	0	8.6	6.0	0.3	0	0	0.7	0	7.0
12	S	0	0	0	S	0	0.0	0.1	0	0	0.1	0.7	0	0.9
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0.8	0	0.8	0	0.3	1.0	0	0.8	0	2.1
15	S	0	S	0	0	0	0.0	0.4	0.2	7.3	0	0.3	0	8.2
16	0.5	0	5.5	0	2.5	0	8.5	0	1.0	0	0	0	8.9	9.9
17	2.5	0	6.5	0	1.0	0	10.0	0	0	0	0	0	10.0	10.0
18	0	0	0	0	8.5	0	8.5	0	0	0	0	0	10.0	10.0
19	5.8	0	0	0	0.8	0	5.8	0	0	0	0.1	0	9.8	9.9
20	0.3	0	0	0	9.0	0	9.3	0	1.0	1.2	0	0	7.5	9.7
21	2.0	0	0	0	0.1	0	2.1	0.1	0.3	0	0	5.4	0	5.8
22	0	0	0	0	0.3	0	0.3	0	0	8.0	0	1.2	0	9.2
23	0	0	7.0	0	0.6	0	7.6	7.6	0	0.5	0	1.5	0	9.6
24	4.0	0	S	0	0.2	0	4.2	4.5	0	0.5	S	5.0	0	10.0
25	0	0	0.1	0	0.2	0	0.3	0	0	0.3	0	0	9.7	10.0
26	0	0	3.0	0	0	6.8	9.8	0	0	0	0	0	9.6	9.6
27	2.5	0	0	0	0.8	0	3.3	0.5	0.1	0.3	0	1.0	3.0	4.9
28	2.0	0	0	0	4.5	0	6.5	8.5	0	0	0	1.0	0	9.5
29	9.9	0	0	0	0	0	9.9	0	0	6.0	0	0	4.0	10.0
30	0	0	0.3	0	9.0	0	9.3	0	0	0.8	0	0	9.2	10.0
	2.1	0.0	1.4	0.0	1.7	0.6	5.8	1.7	0.4	1.2	0.0	0.7	3.9	7.9

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Gangaroowa near Kandy, Ceylon.

P. M. 10.0							Ozone.		9.30 A.M. Direction of wind.		Velocity in feet per Second.
Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.	6 A. M.	6 P. M.	Vane.	Lower Clouds.	
0	0	0	0	0	9.0	9.0			N N E	N N E	0.88
10.0	0	0	0	0	0	10.0			Variable	N [ble	3.78
0	0	0	0	0	10.0	10.0			S W	Cm. or varia-	0.35
2.0	0	0	0	0	8.0	10.0			N	N N W Calm	2.38
6.0	0	0	0	0.4	0	6.4			W	S W	0.44
0	0	0	0	0	0	0.0			N N W	N N W	1.14
0	0	0	0	0	0	0			W N W	N W	2.11
0	0	0	0	9.0	0	9.0			Variable	Calm	1.41
1.0	0	0	0	9.0	0	10.0			N N E	Variable	2.82
0	0	0	0	0	10.0	10.0			N W	N	3.08
0	0	0	0	5.0	0	5.0			S S W	None	0.62
0	0	0	0	5.0	0	5.0			W	None	1.76
0	0	0	0	9.6	0	9.6			.....	.....	0
0	0	0	0	7.0	0	7.0			W	Variable	3.87
0	0	3.0	0	0	0	3.0			S S E	None	1.41
0.3	0	9.7	0	0	0	10.0			E by N	N E	2.90
0	0	0	0	0	10.0	10.0			S W	Calm or N E	1.41
0.8	0	8.7	0	0	0	9.5			N N E	Variable	0.62
0	0	0	0	0	10.0	10.0			Variable	Calm	0.70
0.3	0	0	0	8	0	0.3			S E by S	E by N	4.49
0	0	0	0	0.5	0	0.5			E	E	5.54
0	0	0	0	0	10.0	10.0			E	E by N	6.95
1.5	0	0	0	0.1	0	1.6			E N E	S E	7.92
3.0	0	4.0	0	2.5	0	9.5			E	?	3.43
0	0	0.2	0	9.8	0	10.0			E S E	E N E	6.95
0	0	0	0	0	0	0			N E by N	E by N	4.75
8	0	0	0	0	0	0.0			E N E	E N E	6.51
9.0	0	0	0	0	0	9.0			E	E N E	2.64
0	0	0	0	0	10.0	10.0			S W	None	0.62
0	0	0	0	0	10.0	10.0			N	N N E	3.78
1 2	0.0	0.9	0.0	2.1	3.1	7.3			.....	.....	2.94

Ozone papers not yet received.

Ozone papers not yet received.

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Gangaroowa near Kandy, Ceylon.

November, 1863.	3.30 P. M. Direction of wind.		Velocity in feet per Second.	10.0 P. M. Direction of wind.		Velocity in feet per Second.
	Vane.	Lower Clouds.		Vane.	Lower Clouds.	
1	W N W	Calm	2.29	S S W (?)	Calm	0.00
2	N N W	N W	7.04	N W by N	None	1.14
3	E N E	N	1.50	N	None	1.23
4	W	Calm	2.82	Calm	W by S	0.00
5	S S W	W	2.90	N W by N	Calm	0.44
6	S W by W	W S W	1.14	?	None	?
7	W N W	Calm (?)	3.52	.....	.....	0
8	W	Calm	4.05	Calm	?	0.00
9	W N W	?	2.64	Calm	Calm	0.00
10	N W by W	N E by E	2.99	N W by N	?	0.09
11	N W by W	N E and Calm (?)	2.38	N by E	?	4.40
12	W N W	Calm	4.22	Calm	N E (?)	0.00
13	.....	.....	0	N W	?	0.26
14	N W	Calm	3.34	N	?	1.50
15	W N W	N E	3.52	N W	None	0.53
16	S S W	N (?) Calm (?)	0.09	N N E	None	3.26
17	W S W	W	4.14	Calm	W S W	0.00
18	S S E	Calm	3.96	N N E	None	1.41
19	S	S W by (?)	2.82	W S W	?	0.00
20	E	E N E	4.22	N E by E	None	2.38
21	W by S	S S E, E N E & Calm	0	Calm	E	0.00
22	N by E	E by N & Calm	3.70	N E	?	5.46
23	E N E	E N E (?)	6.25	N E	Calm (?)	2.55
24	W N W	Calm	2.55	N by (?)	E	0.00
25	S S W	N N E & Calm	0.00	Calm	E N E	0.00
26	E N E	E & Calm	4.40	N N E	None	0
27	N E	E N E	3.78	E N E	None	2.64
28	E N E	N E	0.62	Variable	None	0.44
29	W N W	E by N	0.79	N	N E	0.44
30	E by N	N N E	1.50	N N E	?	2.38
	.....	.....	2.97	.....	.....	1.13

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Gangaroowa near Kandy, Ceylon.

Distance in Miles in 24 Hours.	Lightning and Thunder.
20.86	In after even L & Th. dist. to N & L R to E S E—S E.
21.81	Th. in after noon & fore even; L R to W N W in after even.
31.41	Th. in after noon L & Th. dist. in fore even.
27.81	
22.10	L R to S S E at 10 P. M.
21.19	
49.72	
25.39	L R to S E in after even, early.
24.19	L R to S E in after even, early.
25.76	L R to S E in after even, early.
28.21	L R to S E in early after even.
29.58	
25.95	L R to S all after even.
22.98	L R to S all after even.
21.55	In fore even L & Th. to W—W S W dist. 5 to 12 Miles.
28.94	
30.77	In after noon & early fore even. L & Th. a few miles away & 1 lattr. dist.
22.01	In fore even. L & Th. 7 or 8 miles dist. [to N E—E N E.
39.78	L R to W N W—N W in early after even.
35.12	
68.16	
84.37	L to S W in early after even.
36.78	
43.41	
53.81	L R to W S W in after even.
66.32	
57.54	L R to S W in early after even.
34.84	
47.74	
34.94	

Gangaroowa near Kandy, Ceylon.

November, 1863.	GENERAL REMARKS.
1	Fine and pleasant till 3 P. M.; very sultry and oppressive after.
2	Fine till noon; heavy nimb. and rain after morn and fore even, then fine.
3	Fine till noon; after, heavy nimb. and rain which in fore even, heavy.
4	Fine till noon; after, heavy nimb. but only light rain.
5	Fine after morn then cloudy with nimb. and showery.
6	Fine, dry and pleasant day.
7	Fine, dry and pleasant day.
8	Fine, dry and pleasant day.
9	Fine, dry and pleasant day.
10	Fine, dry and pleasant till even, then sultry; cloudy and some rain.
11	Cool at morn, fine, mild to hot, dry and fresh day.
12	Fog at morn, fine, mild to hot, dry and fresh day.
13	Cool and fresh at morn, fine, mild to hot, dry and fresh day.
14	Fine, warm to very hot and dry but pleasant till 6 P. M.; then sultry.
15	Fog at morn, fine, mild to hot, dry and fresh day.
16	Fine till noon; after, heavy nimb. and rain.
17	Fine till noon; nimb. and heavy rain in after noon fore and after even.
18	Fine but dull till noon; after, the same as above.
19	Fine till noon; after, heavy nimb. and rain.
20	Fine till noon; nimb. and light rain in after noon and fore even.
21	Fine, fresh day; light shower at 4 P. M.
22	Fine, fresh day; light shower at 4 P. M.
23	Fine, mild to very warm, dry and fresh day.
24	Fine, dry & fresh till noon; sultry in after noon, heavy nimb. & rain to S. E.
25	Fine till noon; after, nimb. and light rain.
26	Dull cloudy day; light rain in after noon, fore and after even.
27	Fine till noon & in fore & after even; in after noon nimb. & light rain.
28	Fine till noon & in fore & after even; in after noon nimb. & light rain.
29	Fine till 3 P. M. then heavy threatening nimb. and a few drops of rain.
30	Dull after morn, low nimb. and incessant light rain after 11 o'clock.

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JOURNAL

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No. V. 1864.

On the Origin of the Hindví Language and its Relation to the Urdu Dialect.

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The history of our vernacular dialects, like that of our social and political condition during the Hindu period, remains yet to be written. It is not remarkable, therefore, that considerable difference of opinion should exist as to their origin. Our Sanskritists take every thing to be Sanskritic. Those of our philologers who have devoted much of their time to the dialects of the south of India, cannot, from habit and long association, look at an Indian dialect from other than a Turanian stand-point. And most of our Persian and Arabic scholars, in the same way, observe every thing through a Semitic medium. Hence it is that the Hindví has been sometimes called a Sanskritic, sometimes a Turanian, and sometimes a Semitic dialect. The balance of opinion, however, now prepondérates in favour of the theory which assigns to it a Sanskrita origin. It has been shewn that the affinity of its roots is unmistakeably Aryan, that its phonology and laws of permutation are peculiarly Sanskritic, and that the number of Sanskrita vocables traceable in it, amount, at the lowest computation, to 90 per cent. The discussion on the subject has, however, not yet been brought to a close. Even at the last meeting of this Society, my learned and respected friend, Capt. Lees, in his valuable essay on the Romanising of Indian Alphabets, stated that the Hindustáni had not an alphabet of its own, and was therefore a fit

dialect to be written down in the Roman characters. It may not be uninteresting therefore to enquire what is the origin of the Hindví, the parent of the Hindustáni, and how far is it removed from the original Sanskrita to be disentitled to the use of the Nágarí alphabet as its natural symbolical representative; although in making the enquiry, I shall necessarily be obliged to run over ground which has already been very carefully traversed by some of the most distinguished philologers of the day, and to repeat much that is generally well known and admitted.

The Hindví is by far the most important of all the vernacular dialects of India. It is the language of the most civilised portion of the Hindu race, from the eastern boundary of Behar to the foot of the Soliméni Range, and from the Vindhya to the Terai. The Gúrkhas have carried it to Kemaoon and Nepal, and as a *lingua franca* it is intelligible everywhere from the Kohistan of Peshawar to Assam, and from Kashmir to Cape Comorin. Its history is traceable for a thousand years, and its literary treasures are richer and more extensive than of any other modern Indian dialect, the Telegoo excepted. No doubt it has not always been the same, nor is it exactly alike every where over the vast tract of country in which it prevails. For a living language growing with the progress of time, and diversely influenced in different places by various physical, political and ethnic causes, such a thing would be impossible. But there is sufficient similitude between the language of the *Pṛithvíráya-Ráso*, the most ancient Hindví work extant, and the Hindví of our day, and between the several dialects of Hindví, Hindustáni, Braja Bháshá, and Ráñgri into which the modern Hindví is divided, to shew that they are all essentially one—dialectic varieties of the same language—branches of the same stem, and not issues from different trunks.

The *Pṛithvíráya-Ráso* was written nearly nine hundred years ago, and yet the difference between its language and that of the *Premaságar* one of the most modern books in the Hindví, is not even so great as —certainly not greater than—that between the languages of Chaucer and of the *Times* newspaper, and whatever that is, it is due more to the use of obsolete and uncouth words than to any marked formal peculiarities. Chand, the author of the *Pṛithvíráya-Ráso*, has been very aptly described by the learned de Tassy as the Homer of the Rájputs.*

* Chand, qu' on a nommé l' Homère des Rajpouts, est certainement le plus populaire des poétes Hindví. De Tassy's Rudiments de la Langue hindví, p. 7.

He was a minstrel in the court of Pṛithvíráj, the valiant knight of Kanouj, and appealed to the people in language suited to their capacity. It will be no presumption then to take the language of his epic as the vernacular of the then flourishing kingdom of Kanouj and of Northern India generally. How long before the time of Chand, that language was the vernacular of India, it is impossible now to determine, for from the time of Vikramáditya the great to that of Pṛithvíráj, we have no reliable information of any kind regarding the vernaculars. The literary work of every-day life was in those days transacted in the Sanskrita, and the language of familiar intercourse was never thought worthy of record.

Passing over *per saltum* the gap between the time of Pṛithvíráj and Vikrama, we find in the first century B. C., a number of dialects bearing the names of some of the principal provinces of India, such as Behar, Mahratta, &c. These were undoubtedly the vernaculars of those provinces at the time, for they could not otherwise have taken their local designations, nor assumed the position they held in the dramatic literature of the time of Vikramáditya. Their mutual differences were but slight, not much more prominent than what may be noticed in the English as spoken in London, Wales and Yorkshire; and they were all known by the common name of the Prákṛita. Professor Wilson, it is true, was of opinion that the Prákṛita could not have been a spoken dialect, but his arguments have been so fully met and so frequently refuted by Max Müller, Sykes, Weber, Lassen and a host of other distinguished scholars, that I need not dwell upon them here.

Two centuries before Vikramáditya, As'oka appealed to his people in favour of Buddhism in a language which has been called the Pàli. It was a form of Prákṛita standing midway between the language of Vararuchi's grammar and the Sanskrita of Páṇini. Whether it was ever a vernacular of India has been doubted, and some have gone the length of calling it a "quasi religious" or a "sacred dialect." But "a careful examination of the As'oka edicts," to quote what I have elsewhere said, "clearly shews that it is a stage in the progress or growth of the Sanskrita in its onward course from the Vedic period to the vernaculars of our day, produced by a natural process of phonetic decay and dialectic regeneration, which can never be possible except in the case of a spoken dialect. Professor Max Müller, advert-

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ing to these changes, justly says, they 'take place gradually, but surely, and what is more important, they are completely beyond the reach or control of the free will of man.' No more could As'oka and his monks devise them for religious purposes, than change the direction of the monsoons or retard the progress of the tides. It is said that Marcellus, the grammarian, once addressed the emperor Tiberius, when he had made a mistake, saying, 'Cæsar, thou canst give the Roman citizenship to man, but not to words;' and *mutatis mutandis*, the remark applies with just as much force to As'oka as to Tiberius. There can be no doubt that As'oka was one of the mightiest sovereigns of India. His sway extended from Dhauli on the sea board of Orissa to Kapur-di-Giri in Afghanistan, and from Bakra in the north-east to Junagar in Guzerat. His clergy and missionaries numbered by millions; they had penetrated the farthest limits of Hindustan proper, and had most probably gone as far as Bamian on the borders of the Persian empire. Religious enthusiasm was at its height in his days, and he was the greatest enthusiast in the cause of the religion of his adoption. He devised his edicts to promote that religion; had them written in the same words for all parts of his kingdom; and used exactly the same form everywhere: but with all his imperial power and influence, he could not touch a single syllable of the grammar which prevailed in the different parts of his dominions. In the north-west, the three sibilants, the *r* above and below compound consonants, the neglect of the long and short vowels, and other dialectic peculiarities, rode rough-shod over the original as devised by him and his ministers and apostles in his palace, and recorded in Allahabad and Delhi; while at Dhauli nothing has been able to prevent the letter *l* entirely superseding the letter *r* of the edicts. Had the language under notice been a "quasi religious," or a "sacred dialect," it would have been found identically the same in all parts of India, for the characters used in the Delhi, Allahabad, Dhauli and Junagar records are the same, and if uniformity had been sought, it could have been most easily secured. But popularity was evidently what was most desired, and therefore concessions were freely made in favour of the vernaculars of the different provinces at the expense of uniformity. Unless this be admitted, it would be impossible to explain why the word *Rájá* of Delhi, written in the same characters, should in Cuttack change into *Lájá*. Had the language been a sacred

one, intended for the clergy only, no such concession would ever have been required. The Sanskrita of the Brahmanic priesthood is alike everywhere, and so is the Latin of the Roman Catholic clergy. It is the people whom As'oka wished to address, and accordingly adapted his language to the capacity and the idiom of his hearers." And if these arguments be admitted, and similar arguments have already led Dr. Max Müller, Mr. Muir and others to admit, that the Páli was the vernacular of India from Dhauli in Cuttack to Kapur-di-giri in the Yusafzai country in the time of As'oka, and for some time before and after it.

Ascending upwards to the time of the first great convocation of the Buddhist clergy, soon after the death of S'akya Siñha, we come across a kind of corrupt Sanskrita called the *Gáthá*, which was used for ballads and improvisations by the scalds and bards of that period. For reasons which I have already submitted to this Society in my paper on the Gáthá dialect, I take that language to be the first stage in the transition of the Sanskrita into the Prákṛita, and the vernacular of Brahmanic India in the fifth and sixth centuries before the Christian era.* For the purposes of the present enquiry we need not proceed further. We have the Gáthá proceeding directly from the Sanskrita and forming the vernacular of India in the sixth century, B. C.; the Páli following it in the third, and the Prákṛita in its different forms of Mágadhí, Saurasení, Mahráṭṭi, Pais'áchi, &c. in the first century of that era. How long the last flourished we know not, nor have we any information as to the transitions it underwent, or the dialect or dialects which succeeded it. But passing over a period of about a thousand years, we come to the Hindví in the tenth century, and the question hence arises, Is the Hindví a produce of the Prákṛita, or a different and distinct language which has succeeded it? Muir, De Tassy, and the German philologers generally, maintain the former position; while Crawford, Latham, Dr. Anderson of Bombay and others assume the latter. They all agree that no less than 90 per cent. of the vocables of the Hindví are Sanskrita; and if the affinity of its roots were alone to decide the question of its affiliation, there could be no doubt as to its claims to a Prákṛitic, and necessarily a Sanskritic origin. But, since a language is to be judged more by its formal than by

* Dr. J. Muir has adopted this opinion in his *Sanskrit Extracts*, Vol. II. p. 124 *et seq.*

its radical elements, and the formal elements of the Hindví are apparently very unlike those of the Sanskrita, but closely similar to those of the Scythic group of languages, it is argued that it must be a Turanian or Scythic, and not an Aryan dialect. To meet this, we must enter into some detail regarding the changes which the grammatical apparatus of the Sanskrita has undergone in some of the Sanskritic dialects, such as the Gáthá, the Páli and the Prákṛita and then trace its relation to the Hindví.

Beginning with the inflection of nouns, we find that the first step in the transition of the Sanskrita into the Gáthá, was the omission of the mark of the nominative singular—*s*, which after *a* assumed the form of the aspirate *visarga*. Where the Sanskrit said *Rámah*, the Gáthá was contented with *Ráma*. This was exactly what was to be expected, for the most prominent feature of the changes which led to the transition of the Vedic Sanskrita into the language of the Rámáyaṇa and the Mahábhárata was the softening down of harsh and difficult combinations of several consonants, and of elision of aspirates. The aspirate of the nominative singular was, besides, not common to all nouns, but only to themes ending in *a*. Words ending in consonants, in the vowel *ṛi* and in long *í* or *ú*, received no aspirate, and their analogy prompted the elision of it also after *a*. This elision in the Gáthá was, however, occasional and not universal. It retained the aspirate as often as it dropped it, and sometimes supplied its place by the letter *u*, and so all the three forms of *Rámah*, *Ráma* and *Rámu** are to be met with in the ballads of the Gáthá.

The *s* of the Sanskrit, which becomes a visarga after *a*, changes into *o* if an *a* follow it. But in the Zend, the latter condition is not necessary, hence *o* is the usual termination in the nominative singular, and it is its contraction that we meet with in the Gáthá in the form of *u*. The Páli of As'oka's edicts omits the *s*, but never takes the *o* or *u*; but in the Páli of Kátyáyana's grammar and as we find it in the Cingalese chronicles, the *o* is preferred to simple elision, so is it in the Prakṛita. Of the modern vernaculars the Braja Bháshá or the Hindví of Mathurá alone occasionally takes the *u*, but the others all drop all case-mark for the nominative. Thus the Sanskrit *Bálakah* becomes in Gáthá *Bálaka* or *Bálaku*,* in Páli *Bálako*, in Prákṛita *Bálaka*, and in

* I have not noticed these words declined in the different forms, but the forms occur in connexion with different words.

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Hindví *Bálak* or *Bálaku*. The euphonic laws which regulate these changes are not yet known, but their operation is universal, and we accordingly find that the *s* of the Latin nominative singular is first dropped in the language of the Troubadours, in Provençal and French, but transformed into *o* in the Italian and Spanish. Thus the Latin *oculus*,* eye becomes in Provençal *huel*, in French *œil*, in Italian *occhio*, and in Spanish *ojo*; the changes being almost parallel to what we have seen above.

The flexional termination for the *accusative*, like that of the nominative, has been either dropped or assimilated with the dative in almost all the modern vernaculars. This commenced as early as the time of the *Apabhramsa* in which the Sanskrit accusative mark *m* used to be frequently if not uniformly omitted. In the Hindví, this mark is *ko*, which in some of its patois, in poetry, and in some of the earlier writings, occurs in the form of *ku*, *koñ*, *kauñ*, *kaha*, *kañha*, *kahañ* and *hi*. Apparently this termination is perfectly distinct from the Sanskrita inflection, for both the accusative and the dative, and this has led to much discussion as to the ethnology of the Hindví speaking races of India. Dr. Kay, (ante xxi. p. 109) thought the *ko* of the Hindví and the *ke* of the Bengali, came from the Tartar suffix *ka*, and Dr. Caldwell bases on the existence of this particle his strongest argument in favour of the Dravidian origin of the Hindví. He says, "of all the analogies between the North Indian dialects and the Southern, this is the *clearest and most important*, and it cannot but be regarded as betokening either an original connexion between the northern and the southern races, prior to the Brahman irruption, or the origination of both races from one and the same primitive Scythian stock." Dr. Trumpp, commenting upon this, observes: "At the first *coup d'œil* the identity of को, के, का, etc., with the Dravidian dative case-affix *ku*, etc., seems to be quite convincing; yet, on nearer investigation, we shall find this comparison to turn out illusive. In the first instance, the fact speaks already very strongly against it, that the Maráthi, which is the closest neighbour to the Dravidian tongues of the south, has repudiated the use of के or का altogether, and used an affix, the origin of which we have attempted to fix, and as we hope, past controversy. We shall further see that the Gujaráti

* The Sanskrita *Akshi* (eye) the counterpart of *oculus*, runs a similar course, but as a neuter noun takes no case-mark in the nominative.

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and Panjábi have also made up for the dative case by postpositions, borrowed from the Sanskrit, without the slightest reference to the Dravidian languages, and we may therefore reasonably expect the same fact for the remaining Arian dialects. It would certainly be wonderful if those Arian dialects which border immediately on the Dravidian idioms, should have warded off any Dravidian influence, and that those more to the north should have been tinged "deeply" with Scythian characteristics. Fortunately we are able to shew that such an assumption is not only gratuitous, but irreconcilable with the origin of the above-mentioned dative affixes. We derive the Sindhi खे and the Bengali के from the Sanskrit locative क्षते, 'for the sake of,' 'on account of,' 'as regards,' being thus altogether identical in signification with the Márathí ला, Bengali *re*, etc. This will at once account for the aspiration of ख in the Sindhi खे, for this is not done by mere chance, but according to a fixed rule. [See my System of Sindhi Sounds, 1, and note.] In Bengali there is no such influence of *r* on the aspiration of a preceding or following consonant, and therefore we have simply के. The Sanskrit form क्षते becomes in Prákṛit first किते, then (by the regular elision of त्) किए, and contracted to के, and in Sindhi by the influence of (elided *r*) खे.

"The Hindví and Hindustani form of this affix को (dialectically pronounced kú in the Deccan), which has apparently invited its comparison with the Tamil *kú*, etc., we derive in the same way from the Sanskrit accusative neuter क्षतं, which is used adverbially with the same signification as the locative क्षते. In Prakrit already, and still more so in the inferior dialects, the neuter is confounded with the masculine, (and in the modern dialects which have no neuter, the neuter has been altogether identified with the masculine); we have therefore first in Prákṛit, किते, then again (by regular elision of त) कि या, and contracted को. We can thus satisfactorily account for all these three forms, खे, and को, and का; how Dr. Caldwell will now identify them with the Dravidian *ku*, etc., I cannot see. That this derivation of खे, के, and को rests not on a mere fancy of mine, is farther proved by the Sindhi particle रे *without*, which is derived in the way described, from the Sanskrit locative form ऋते, 'with the exception of,' 'excepted,' 'without;' Prákṛit first रिते, then रिए, and contracted रे."*

* Journal Rl. As. Soc. XIX. p. 392. The *re* turns up in the Bengali dative in the same way.

This explanation, ingenious as it is, is not satisfactory. *Kṛita* is a participle from the root *kṛi* "to do," and the dative or accusative signification attributed to it is altogether a forced one. The indeclinable particle *kṛite* is often used in Sanskrita in lieu of, or to imply, some forms of the dative; but its contraction does not yield *ko*. We must look elsewhere, therefore, for the origin of this puzzling particle, nor are we at all at a loss on the subject. Professor Max Müller derives the Bengálí dative *ke* from the Sanskrita suffix *ka*, which is largely used in modern Sanskrita as an expletive, and I think we may trace in it the germ of the Hindví *ko*. As a simple means of reducing nouns of different terminations to one standard, the syllable *ka* is a valuable adjunct, and scalds and improvisatores use it frequently to obviate the necessity of a multiplicity of declensions. Now, if we bear in mind that in the Gáthá, the ordinary method of indicating the elision of a case-mark is by the addition of *u* as in the words *jayu* for *jayam*, *kṛitu* for *kṛitam*, *kálu* for *kálam*, &c., (vide my edition of the Lalita Vistara,) we find the missing components of *ku* which was the architype of *ko*, and which is still largely used in colloquial Hindví for both the dative and the accusative. We believe the *ka* at first took the ordinary accusative affix *m* after it. But gradually it wore down to a nasal *ñ* and the inflexion became *kañ*. This transition is by no means uncommon in Aryan languages. In Greek the Sanskrit accusative affix *m* passed into *n* at a very early period, and in Bengálí it is invariably sounded as *ñ*. Now if we apply the expletive *u* to this *kañ* it becomes *kuñ*, and in this form we meet with it in the Uriah, which has preserved its similitude to the Sanskrit with more care than any other Indian dialect. It also occurs in the Deccan Hindví, and in the Braja Bháshá. The prolongation of the *u* yields *koñ*, and this variously pronounced forms in Northern India *koñ*, *kauñ*, *ko*, and the rest.

The dative of the Sanskrit in the first person singular is *e* which added to *ka* makes, by the elision of *a*, the Bengálí dative *ke*. It is true that according to the rules of Pánini, the *e* of the dative after themes ending in *a* should change into *aya*, but as corruption is the result of a fanciful analogy on the part of the illiterate masses, it is not remarkable that the universal affix *e* should replace the especial *aya*. In the Gáthá the reverse of this often occurs and the especial *ena*, the instrumental ending of themes in *a*, is frequently used after themes ending in consonants instead of the more legitimate and general affix

á ; the examples being *mahatena* for *mahatá, yasena* for *yasasá, rájena* for *rájñá.*

One form of the *instrumental* in the Sanskrit is *ná.* It is used after themes in *i, u* and *ṛi.* and the Hindví adopts it with but a slight change in the vowel, the endings being *na, ni, ne* and *neñ.* The similitude here is so close that we need not dwell on it at any length.

The Sanskrit *ablative* termination in the singular number of words ending in other than *a* is *as.* This changes into *hi* or *hinto* in the earlier Prákṛitas, and to *he* in the later, in which the ablative is confounded with the genitive. In the Bengálí the *hinto* passed into *haiñte* a little before the time of Chaitanya Deva, and subsequently into *haite,* the form in which we now have it. The *he* of the Prákritas, according to Dr. Trumpp, merged into *se* or *señ* in the Hindví on the ground of *h* and *s* being interchangeable, but we think the original Sanskrita *smát* the especial affix of the pronouns, offers a more probable source of *señ* and *se* than the secondary *he.* In either case the origin of the termination is purely Sanskritic. In the Braja Bháshá the *se* is generally replaced by *teiñ,* an obvious corruption of the Sanskrita *tas.*

The *genitive* affix in the Bengali and the Uriah is formed by hardening the Sanskrita *sya* into *ra.* But in all the other Aryan Indian dialects, a novel mode is adopted which is traceable only in the old Vedic language. According to Dr. Trumpp, "The noun, which ought to be placed in the genitive case, is changed into an adjective, by an adjectival affix, and thence follows naturally, that this so-called genitive, which is really and truly only an adjective, must agree in gender, case, and number with its governing noun, as every other adjective does. The adjectival affix, used thus, to make up for a genitive, varies in the different dialects * * * The Hindví and Hindustání have preserved the original Sanskrit adjectival affix क without changing into a palatal, viz., का ; in Hindví we meet with the genitive affix को को. A further proof that these genitive affixes जो, चा, का, कौ, etc., are really the adjectival affix क of the Sanskrit, and the को of the Prákṛit, we have in the fact, that they all end in *o,* a *long vowel, ó = á ;* as all those adjectives do, which are formed with this affix (see my system of formation of themes under the termination को.)"

The *locative* in the Sanskrita is *i* or *e,* which has been carefully preserved in the Bengalí, though the ablative *te* proceeding from the Sanskrita *tas* is occasionally used in a locative sense. The *e* changes

into *smin* after words of the class "*Púrva, &c.*" and this *smin* seems to have been adopted as a general termination for the locative in the Páli. In the Prákṛita it merged into *mmi*, and in the Hindví the *mmi* appears in the different forms of *meñ, mai, moñ, mañ, mahi,* &c. Dr. Trumpp has overlooked this obvious derivation in his "Declensional Features of the North Indian Vernacular," in which he says, "In Hindví and Hindustání the locative, as a case, has been quite lost, and only some vestiges of it remain, as: होते, or emphatic होतेहो, 'in being,' and thus a locative can be formed with all participles, present or past, which are generally looked upon by our European grammarians as indeclinable participles, but which are in reality only locatives as it is most clearly borne out by comparing the cognate dialects."* In some forms of the Hindví, the *me* of the locative is replaced by *pai* and rarely by *paiñ*, the origin of which we can trace only to the Sanskrita preposition *upara* "upon" which first changed to *par* in such sentences as *mupar* "on me," and subsequently to *pai*, the nasal affix being a euphonic adjunct which in the Braja Bhásha is largely introduced often without any obvious reason. The same was the case in the Bengalí four hundred years ago, and the *Chaitanya Charitámṛata* affords innumerable instances of its use in words like *jáyiñá, khañyiñyá* for the modern *jáyiyá, kháyiyá,* &c.

The *vocative* in the Hindví is identically the same as in most forms of the Sanskrita, being formed by the addition of the interjections *he, re, ahe* (for *ayi,*) &c. A few of the interjections are peculiar to the Hindví, but they offer nothing of importance for comment.

The *personal pronouns* are so obviously Sanskritic that we need not swell this paper by tracing the gradual changes which they have undergone from the time of the Prákṛitas to our own day. The only word which appears to some to be of doubtful origin is the third person *vah* plural *vai*, but the difficulty vanishes if the Sanskrit *asau* be taken as its archtype.

The verb generally undergoes a greater variety of changes than any other class of words. It is said that in some American languages, verbal roots may appear in no less than six thousand different forms. In Sanskrita, the changes are not so numerous, still they exceed three hundred. In Greek and Latin they are less, and in modern European languages generally very few; in English the least—not

* Journal Rl. As. Soc. Vol. XIX. p. 398.

more than six or seven in all. Still compared to nouns of their respective languages, the verbs assume a much greater variety of forms, and therefore their conjugational affixes offer the most ready materials for tracing their origin. This test applied to the Hindví fails entirely to detect in it the smallest amount of a Scythic or Dravidian element. No doubt the niceties of the Sanskrita conjugation, the ten classes, the three voices, the ten moods and tenses, have all disappeared in the Hindví, as they have more or less in all other modern vernaculars, whether Indian or European ; but what is left to us is purely Sanskrita and not foreign, and we may fairly conclude therefore that what has disappeared was likewise Sanskritic, and that the whole system owes its origin to a Sanskrita source. The process has been that of decay and regeneration, and not of development and expansion. History does not afford us an instance of a language growing out of a rude state, developing new forms and gradually acquiring symmetry and perfection, such as the Latin out of the Spanish or the Italian. It is the perfect that wears out and readjusts its members when the first arrangement ceases to be expressive. Hence it is that we find in the Hindví, as in all other vernaculars, the original inflections losing their power and significance and yielding their places to verbs and participles, which in their turn wear out and assume the form of inflections. It is easy to suppose that the verbs which will most frequently adopt this auxiliary character are those which indicate "to be," "to exist," "to live," "to go." These in Sanskrita are *as*, *bhu*, *sthá* and *gam*, and they therefore constitute the principal auxiliaries in the conjugation of the Hindví.

The *bhu* of the Sanskrita becomes in the first person singular of the present tense *bhavámi*. In the Gátha the process which converts *bhu* into *bhava* is partially carried out, and the word becomes *bhomi*. In the Prákṛita the *bhu* changes to *ho* and *huba* and those forms continue in all the Aryan Indian vernaculars. Some think the transition of *bhu* to *ho* to be unnatural and therefore assume it to be a non-Sanskrita word, but, besides the authority of Vararuchi who nineteen hundred years ago wrote down in his grammar the rule* that "in Prakrit *bhu* should be changed to *ho*, and *huba*," we find that notwithstanding the

* *Bhubo ho hubau.* Dolius *Radices Prákriticæ*, *p.* 1. *B* and *h* were interchangeable even in the time of the Vedas and in the *Srauta Sutra* of Aswalayana, the same word is written at option both *gribhíta* and *grihíta*.

use of two thousand years the *ho* in the past tenses of the Braja Bháshá appears in its primitive form of *bha* in *Bhaye, Bhayethe, &c.* The conjugated form of the *ho* in the Prákṛita was *homi*, and in the Hindví *huñ.* In the definite present this again is intensified by the addition of the past participle *hotá* before it.

The past tense is formed by the past participle *hotá* with the aid of the Sanskrita *sthá* "to remain" changed to *thá*, the personal distinction being indicated by the alteration of the terminal vowel. The perfect is formed by the union of the present participle with the present tense, *huá-hoñ*. This duplication of the verb in the perfect tense is peculiarly Aryan. It occurs in Sanskrita, Greek, Latin, Zend, Anglo-Saxon and Gothic, and is by itself a strong proof in favour of the Sanskrita affiliation of the Hindví. In the pluperfect the *thá* again occurs as an inflection, the verb remaining in the form of the present participle *huá.* For the future tense the auxiliary is the root *gam* "to go" in the form of *gá* or *ge* added to the verb in the indicative present. This paraphrase is peculiar and not common in any other Sanskritic vernacular. Its analogue in the English may be traced in such phrases as *I am going to do.*

In the case of other verbs *ho* becomes an auxiliary for the perfect, the other tenses being conjugated in the same way as *ho;* it is not necessary, therefore, to adduce examples.

Nor is it necessary to dwell longer on the subject of the grammatical forms of the Hindví. What has been said will, I trust, be sufficient to shew the strong affinity which it has to the Sanskrita, and the relation it bears to the Prákṛiṭa and the other Aryan vernaculars of India. There are, we admit, breaks in the chain of our evidence, but they are not of such a character as to render the whole untrustworthy. At any rate it will be seen that the Hindví as it stands, could not have proceeded from any other known language except the Sanskrita, and this sort of negative evidence, in the absence of positive proof, has been recognized in judicature, and may with every reason be adopted in history.

It has been said that inasmuch as the earliest seats of the Bráhmans in India at the time of their advent were occupied by the aborigines, and the two races freely coalesced together, their vernaculars must have, from a very remote period, assumed a mixed character. But the Vedas give us no reason to suppose that any such extensive

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admixture did take place. On the contrary it is certain that the aborigines receded as the tide of the Aryan conquerors flowed onward from the north-west, very much in the same way as the Red Indian in North America receded from the contact of the Saxon and the Celt, and they could not therefore leave behind much of their dialects to leaven the language of the aggressors. At the same time as it is impossible for two languages to come in contact without exchanging their vocables, so we find that from 5 to 10 per cent. of the vocables of the modern Aryan vernaculars of India are of non-Sanskrit or Turanian origin. Owing to the same cause the dialects of the aborigines shew a considerable stock of Sanskritic vocables, varying of course in proportion to the extent of intercourse which the different tribes who speak them had with the Bráhmans. When the aborigines had receded beyond the Kṛishṇá, their flight was checked by the sea, and they had accordingly there to make their last stand against their conquerors, and it is beyond the Kṛishṇá, therefore, that we find the descendants of those aborigines in the largest number and in full possession of their original dialects.

After having thus taken, what I trust will appear, a sufficiently consistent view of the origin of the Hindví, I shall now turn to the *Urdu*, otherwise called the *Hindustání*. Mahomedan writers inform us that the necessity of colloquial intercourse between the Moslem invaders and the natives of this country, produced a mixed dialect of which the grammar was purely Indian, but the vocables partly foreign and partly Indian. It was first principally used by the Affghan soldiery and therefore called the *Urdu* or the "camp dialect." Chiefs and nobles next took it up and it now forms the language of nearly half of the Mahomedan population of the country, the other half speaking the ordinary Hindví. This sort of fusion of the vocables of one language into another is common enough in the history of languages. To a small extent it is taking place in almost every language on earth; and instances are not wanting to shew that it has happened to a very large extent without affecting in the least the grammatical peculiarities of the recipient. In Bengal the language of the courts contains no less than 30 per cent. of Arab, Persian and other foreign words, and still it is acknowledged to be Bengálí. There is a class of books also in Bengálí which is said to be written in "Mahomedan Bengálí," and some of the Gospels have been translated into it. Its

grammar is pure Bengálí, but it contains no less than 35 per cent. of foreign words. The Persian in the same way, though an Indo-European language, has received a large accession of Semitic element from the Arabs without in the least altering its grammar. Again the Turks, though Turanian by birth, have a language which contains, almost in equal proportion, vocables of Semitic Turanian and Aryan origin. Its grammar nevertheless is purely Tartaric. According to certain missionaries quoted by Hervas* "the Araucans at one time used hardly a single word which was not Spanish, though they preserved both the grammar and the syntax of their own native speech." The English, however, offers the most remarkable instance of a language borrowing its stock of words from a variety of foreign sources without in the least altering its grammar. It is well known that in England, for three centuries after the Norman conquest, the language of court and law, and of elegance and fashion, was French, and nobody was held respectable who did not speak in it. This led to the accession of a large stock of French words into the Saxon, generally estimated at 17 or 18 per cent. and to such a change in the character of the language of the metropolis, that Chaucer doubted that his poetry would be intelligible out of London. But its grammar was left untouched. Omitting all mention of the other foreign elements, the Hebrew, Spanish, Italian, Portuguese, Bengálí, Hindustání, Malay and Chinese words to be met with in English, I may observe that it has been proved by Thommeral that of the total number of 43,566 words in Webster's dictionary, no less than 29,853 come from classical and only 13,230 from Teutonic sources. And yet the English is not a classical but a Saxon language, and that because English can be written with words entirely Anglo-Saxon, but never by Latin or French words only. The Bengálí of the Mofussil courts in the same way may have 30 per cent. of foreign words, but those words by themselves can never construct an intelligible sentence. Hence the great axiom in the science of language "that grammar is the most essential element, and therefore the ground of classification in all languages which have produced a definite grammatical articulation."† Applying this rule to the Urdu, we find that in Hindví there are several works which contain but a small admixture of foreign element. Insha Alla Khan wrote a tale in the so-called Urdu, which does not contain a

* Apud Max Müller, Science of Language, p. 76. † Max Müller, loc. cit.

single Persian or Arabic word,* and the largest extent to which Semitic element has been traced in any Urdu work does not exceed 40 or at the outside 50 out of every hundred.† While on the other hand its remaining 50 to 60 per cent. of vocables are Hindví, and its structure and grammar are entirely so, and that to such an extent that it is impossible to construct a single sentence in it without the aid of the Hindví grammar. Pedantic Mauluvis may string together endless series of adjectives and substantives and even adverbs, but they can never be put in concord without indenting on the services of Hindví verbs, Hindví inflections, Hindví case-marks, Hindví pronouns and Hindví prepositions. Nothing could be more conclusive than this ; the grammar of the Urdu is unmistakeably the same as that of the Hindví, and it must follow therefore that the Urdu is a Hindví and an Aryan dialect. A variety no doubt it is, differing from the original in having a large admixture of foreign element, but still a variety of the Hindví, as the Assamese and the Coch are varieties of the Bengalí. Englishmen who maintain that 200 per cent. of Latin and Greek do not alter the Saxon origin of their vernacular will, I am sure, readily admit my position, and if this be admitted the question as to the character in which it should be written becomes self-evident. As Sanskritic dialects the Hindví and the Urdu have undoubted claims to the Nágarí, for that alone can supply the necessary symbols properly to indicate their system of sounds. The Persian alphabet has no such symbols and therefore fails adequately to represent the phonology of the Hindví, except by the aid of a cumbrous system of diacritical marks. It is besides, notwithstanding the great facility with which it may be written, to quote the language of the learned translator of Ferishta, " the most difficult to decipher with accuracy, and the most liable to orthographical errors. In writing it the diacritical points, by which alone anything like certainty is attainable, are frequently omitted ; and in an alphabet where a dot above a letter is negative, and below the same letter is positive, who shall venture to decide in an obscure passage which is correct, or how is it possible that a person unacquainted with the true orthography of proper names can render a faithful transcript of a carelessly written original ?"‡

It is true that owing to a feeling of national pride on the part

* Ante, vol. xxi. p. 1. † Vide Appendix. ‡ Brigg's Ferishta, p. xi.

of the Mahomedan rulers of India, and partly to the inconvenience and trouble on their part of learning a foreign alphabet, the bulk of the literature of the Urdu is now written in the Persian character, which cannot now be changed, and there are certain Arabic and Persian letters, such as ق غ ع ز ذ which have not their counterparts in the Nágarí; but these facts cannot, I contend, invalidate the right of a language to the use of its own native alphabet. In importing foreign words, the rule has hitherto been to assimilate them to the language into which they are imported, and not to invent a new alphabet for their sake; the Greeks did not add to the number of their letters when they met with new letters, such as *j*, in the language of their neighbours, but represented them by their nearest equivalents in their own alphabet, and the same course should be, and in fact has hitherto been, adopted in writing the Hindví.

But whether it be proper to write the Hindví in the Nágarí or the Persian characters, certain it is, on the arguments so ably set forth by Capt. Lees, that the Roman alphabet is by no means adapted fairly to represent its system of sounds.

The question is one of great importance. It has already engaged the attention of some of the most distinguished scholars of Europe,* and it would be presumptuous on my part to dispose it off at the fag end of an article on a different subject. But as a native who feels deeply interested in the prospect of the vernaculars of his country, I cannot allow this opportunity to pass, without observing that the question has been hitherto discussed mainly, if not entirely, from an European stand-point. The benefits which European scholars, officials and missionaries are to derive by substituting the Roman characters in their writing and printing of Indian dialects, are what have been most elaborately discussed, but little consideration has been shewn as to the advantage which the natives are to derive by accepting the Roman as a substitute for their national alphabet. It is from

* It is worthy of note that Sir William Jones, Gilchrist, Wilson and some others whose names are intimately associated with schemes of Romanising, were not advocates for converting all native writing into the Roman character for natives, but for supplying a uniform plan for representing foreign words in European languages for the use of European scholars. Dr. Max Müller's system is also avowedly intended for Europeans. It is called the "Missionary Alphabet," and Christian Missionaries in foreign parts are the principal persons who are expected to benefit by it. Even Lepsius looks to Missionaries for his principal supporters.

that point, therefore, that I wish to discuss the question here. I have not the least objection to the adoption of a uniform system for the reproduction of foreign words in European languages. On the contrary I think, for Englishmen in India, such a system is most urgently needed, as much for the sake of convenience and precision—"to avoid the chaos of caprice"—as for the researches of philologists; and I have always advocated it to the best of my humble powers.

Philologically considered, sounds are all that are of importance in a living language, and therefore it is perfectly immaterial what are the shapes of the symbols which indicate them; and if it can be shewn that one set offers advantages in writing and printing as well as in precision, over another, considerations of antiquity or national vanity ought not to stand in the way of improvement. But as the case stands, while the Roman alphabet is without question highly defective both in its arrangement and in the range of sounds which can be expressed by it, the Sanskrita has been acknowledged by competent scholars to be the most perfect of all known systems of letters, and the proposition therefore amounts to the substitution of an avowedly inferior in place of a superior alphabet. It is true that the Nágarí letters are angular, and in cursive writing must yield the palm of superiority to the Roman, but facility in writing is not the only nor the most important requirement of a good alphabet. Besides, the Roman, notwithstanding its superiority, is in this respect far from being perfect. It is utterly unsuited for the purpose of reporting public speeches, and various systems of short-hand writing have had to be devised for that work. For ordinary rapid writing, such as taking down depositions, the Bengálí and the Persian have been found in our Courts quite as good for the Bengálí and the Urdu languages as the Roman for the English, and the proposed change therefore is uncalled for, particularly when we bear in mind that the Roman letters cannot be used in writing the oriental languages without a multitude of dots and dashes and accents and commas, which completely neutralise its cursive superiority. In the standard alphabet of Lepsius, there are no less than 189 letters, of which the first *a* appears under nine disguises, produced by dots and dashes and hooks and spurs above, below and by the sides. The *d* in the same way has nine, *e* thirteen, *i* nine and *u* twelve disguises. To such an extent has this process of accentuation been carried with regard to the other letters that we

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find but a few that have escaped its metamorphosing influence, and no less than 165* letters heavily loaded with excrescences. Several of those letters are Greek and others oblique and horizontal lines with diacritical marks which had never before been made to do duty for letters, except in some systems of stenography. These are surely not recommendations by way either of simplicity or precision, the two most important requirements of a good alphabet, and hence it is, that the use of the standard alphabet has proved so troublesome in the Cape Colony.† The Roman has only two diacritical marks, the dot on the *i* and the score on the *t*, and both these are unmanageable in rapid writing; to multiply them a hundred-fold, and still to expect that the alphabet would remain simple and easy of writing, is to expect what experience has already proved to be, an impossibility. Mr. J. G. Thompson of Madras once suggested "An unpointed Phonetic alphabet based upon Lepsius' Standard alphabet, but easier to read and write; less likely to be mistaken; cheaper to cast, compose, correct and distribute, and less liable to accident;" but unfortunately for his scheme, his letters were distorted and disproportioned, and so metamorphosed by hooks and loops and spurs that they could not at all be recognised as Roman. Other systems there are, but none free from diacritical marks, nor of so uniform a character as to be generally understood all over Europe. It has been said that when the Roman alphabet becomes familiar to the Indians, it will not be necessary to retain the use of the points, and by their omission, writing will be free and easy. But the proposition amounts to writing a language without vowels, and the mischief of such a course in writing generally, and in mofussil legal proceedings particularly, must be frightful to contemplate.‡ The experiment has been tried already and found to break down completely. The *Kúṭiál* Hindví is written in characters

* It is necessary to note that these are all distinct simple letters and not compound consonants and vowel marks of the Sanskritic alphabets, with which some Romanisers wish to confound them. The Sanskrita is a syllabic alphabet, and therefore every letter or combination of letters represents a complete syllable with its necessary vowel, whereas the Roman, being a literal alphabet, has to put in a separate letter for every sound both consonantal and vocalic that occurs in a syllable, and most of them when used for oriental languages have to receive their special diacritical marks above and below.

† Professor Max Müller declines to give in his adhesion to Lepsius' system.

‡ It has been said that since the Persian, a diacritical alphabet, has been so long in use, the Roman is not likely to prove more troublesome. But the object of the proposed change should be to give us a good alphabet instead of a bad one, and not to substitute a defective one by another equally bad.

closely allied to the ordinary Nágarí, but without *mátrás* or vowel marks, and in this state it is perfectly unintelligible to all except the initiated. Its use is therefore confined exclusively to drafts and cheques, and even there, for the sake of precision, the sums have to be written with such circumlocution as "rupees twenty, the double of which is forty and quadruple, eighty, and the half of which is ten and quarter, five." It is said that once a *gomástá* wrote in it from Agra to his master's family at Muttra, stating that his master was gone to Ajmere and the big ledger was wanted. The words used were

Bábu Ajmir gaye baḍi bahi bheja dijiye.

Without vowel marks and written continuously without breaks in the native fashion, the words were read—

Bábu aj mar gayá baḍi bahu Bheja dijiye.

"Master is dead, send his wife," apparently either to perform a suttee, or attend the funeral obsequies. The story may be false, but I firmly believe that the mistake it is intended to ridicule, will multiply many fold, if Indian languages be written in the Roman characters without diacritical marks.

One great argument in favour of introducing the Roman characters in India, is the uniformity of sounds which will be secured to the whole country. But the argument is based on a fallacy. Sounds are regulated by the condition of our vocal chords, and as those chords must change in their tension, elasticity and power, with every change of climate, human organs of speech cannot produce the same sounds with equal facility everywhere. Hence it is that the Roman characters have no uniformity in Europe. They differ in almost every different country. The alphabet of England is not the alphabet of France, nor is the alphabet of France that of Germany, Sweden or Russia. In each of those countries, the same letters are very differently pronounced, and the difference is greatly increased when they coalesce into words. Further, they do not retain the same sounds in all positions. Their natures and powers vary, and they become hard or soft, long or short, sounding or mute, with reference to the natures of their neighbours, and hence a constant source of difficulty presents itself in their use. This is well illustrated in the pronunciation of Englishmen and Frenchmen. The two races use the same alphabet borrowed from one common source, and yet such is the force of *genius loci* on sounds, that Englishmen find the greatest difficulty in

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pronouncing French words correctly, and the Frenchman is rare who can speak English like an Englishman. It is to obviate this difficulty and secure uniformity in spelling and reading, that the "Phonetic System" has been originated in England, and Ellis, Pitman and others are trying to supersede the Roman characters altogether. This problem of phonetic reform involves questions of mathematics, physiology, and acoustics, besides those of convenience, easy writing, and economy of printing, which I cannot undertake to discuss. The system that will satisfy all the requirements of the different languages that we have to deal with, remains yet to be devised, and until that is done it would be too hasty to take up the proposition in connexion with the Indian dialects. The advocates of the phonetic system, who are making such rapid strides in England, will, ere long, do away with the present arbitrary and puzzling English orthography, and then will be the proper time to think of romanizing the Indian vernaculars. At present the want of uniformity of the Roman characters in the different countries of Europe, has led to many dissimilar and often contradictory systems of romanising; and since every one of them is more or less defective, their introduction in vernacular writing in India, where we have to deal with several distinct nationalities having many peculiar sounds of their own, cannot but prove most troublesome and vexatious. These sound, even when stereotyped by a number of diacritical marks, will still remain peculiar, and be quite as unintelligible as foreign letters to an ordinary European scholar. No language unaffected by physical causes can borrow sounds. Centuries of the Norman conquest failed to force French sounds into English organs of speech,* and it is impossible therefore to suppose that the European languages will ever receive foreign sounds for the sake of a few diacritical marks: and if they will not, where is then the uniformity for which we are to sacrifice all the Indian dialects? If the familiar English *c*, the emblem at different times of *s*

* Perhaps the real cause of the arbitrary character of the English alphabet is due to the adoption of the Roman letters by the Saxons for a Teutonic language, the sounds of which they could not represent without assuming other than the sounds which had been originally assigned to them. Hence it is that the Latin dentals *t* and *d* have become cerebrals in English, the latter having no *t* and *d* sound at all. Translating from the English, a great number of foreign names are, in the vernaculars, written with cerebral *t* and *d* when they should be represented by dentals. A ridiculous instance of this occurs in a Bengálí novel where an aping Young Bengal is made to call his father ডাডাইয়্ ভট্ instead of ডাডায়্রাম ভট্ট.

and *k*, is to read as *ch*, and our *ch* to become something very different, it would be a delusion to talk of uniformity and universality. Admitting for the sake of argument, that foreign sounds can be naturalised in Europe, in order to familiarise them to Europeans, it would be necessary first to remove the ordinary Roman alphabet from European Primers, and supply its place by a standard one, be it of Lepsius, Max Müller or some other; and when it becomes universal in Europe, then to apply it in writing the Indian dialects, so as to render the latter easily readable by every body, and the alphabet identically the same everywhere. But as no European nation will learn 189 characters instead of 26, and that simply for the possible need of learning a foreign language, the plan cannot but appear quixotic in the extreme. Besides, some of the sounds of native languages are so peculiar, that to know them correctly, the language in which they occur must be learnt, and he who has the leisure and inclination to learn a foreign language will never find its alphabet a stumbling block. If he cannot learn the alphabet, he is never likely to learn the language. There is no system of alphabet on earth which cannot be mastered in a couple of hours, and which would not become perfectly familiar in a month; but there is not a language that I know of, which the greatest linguist could acquire with sufficient accuracy for purposes of ordinary conversation, in six months.

Much stress was laid at the last meeting upon the natives of the Peninsula being separated from each other by a number of alphabets, and rendered incapable of mutual intercourse, and on the advantage that would accrue to them by having a common alphabet. But I feel certain that the evil pointed out would not yield to the remedy proposed. We find that while in Northern India, the Hindus with their Nágarí and the Mahomedans with their Persian, meet with no difficulty in carrying on familiar intercourse, the Englishman with his Roman character common to all Europe must starve in a provincial hotel across the channel, if he knew not that bread in French was *pain*. What is wanted therefore is a common language, and not a common alphabet. The latter even when attained, can, at best, but gratify a fancy—that of ideal uniformity, while the former would be a positive good, and come home to the business and bosom of all who attain it.

No discussion on the value of an alphabet in the present day can be complete without reference to its adaptability to printing. I wish

therefore to say a few words on the subject, though I claim no especial knowledge of that art. It has been repeatedly said that the Roman letters occupy less space, and are more easily composed, more lasting, less liable to breakage, and consequently more economical than any other known class of letters, and if these could be proved to be facts, a strong argument no doubt would be made in its favour. But I am afraid the advocates of the Roman alphabet have come to their conclusion, without making sufficient enquiry. I have been assured by several respectable printers, and I know from personal knowledge, that the cost of composing in Sanskrita and Bengálí types is much lower than that of setting up Roman letters; and that the lasting quality of the former compared to that of the latter, is as 2 to 1. The Rev. C. B. Lewis of the Baptist Mission Press, assures me that "the English type soonest shows signs of wearing out. This arises from the more delicate outline of a nicely cut Roman and Italic type—and especially from the seriffe of the letters *i. e.* the fine line at the end of each stroke of b p u s. When this line is worn off, the Roman letter, even if otherwise good, has a very ancient decayed look." As regards breakage, the Roman type has great advantage over the Nágarí, but this advantage is entirely negatived by its wearing out much faster than the latter. On the whole therefore the balance of advantage is in favour of the oriental type and against the Roman. Nor is this compensated by any saving of space through the slimness of the Roman letters. I have a volume by me, containing a prayer by the Armenían patriarch Saint Nersetis Clajensis, translated into thirty-three different languages, and also separate pamphlets containing translations of the same into Sanskrita, Bengálí and Burmese. The translations in German, Hebrew, Turkish, Arabic, Persian, Syriac, Chaldee, Ethiopic, Malayan, Burmese and Chinese are given in large type: the rest in type very nearly alike. These books therefore offer valuable data* for ascertaining the extent of space which a given quantity of matter takes up in different type, and on examining them, I find that the Roman is inferior to the Greek, Sanskrita,

* The following list shews the number of pages which the prayer takes up in the different languages. Armenian 13 pages, Greek 12, Latin 13, Italian 15, French 13, Spanish 14, Lusitanian 16, German 15, Dutch 14, Swedish 14, Danish 13, Icelandic 13, Greenlandic 14, English 14, Hibernian 14, Celtic 16, Wallachian 14, Russian 14, Polish 15, Illyrian 13, Servian 13, Hungarian 14, Iberiac 22, Turkish 13, Persian 16, Arabic 15, Hebrew 14, Syriac 17, Chaldee, 31, Chinese 25, Æthiopic 23, Malayan 20, Malayalim 21, Burmese 12, Sanskrita 12, Bengálí 12.

Bengálí and Burmese, and that if the Semitic letters be reduced to the same face, as that of the Long Primer or the Bourgeois, they would far surpass the Roman in compactness. No doubt the natives of this country, accustomed to manuscripts for ages, are fond of large types, as were the natives of Europe two or three centuries ago; but already the people of Bengal have taken to Bourgeois and Brevier in Bengálí, and the same will soon follow in the Nágarí and the Persian. It is possible that Bengali types, as generally used, with the vowel marks cast in separate pieces and the lines leaded out, take, face for face, a little more space than the Roman, but while this disadvantage may be easily obviated by mechanical means, the superiority of the Roman on this account is so small, that it cannot at all make up for the defects which have been set forth above.

As a question of policy it would not be proper for our present Government—the most liberal and tolerant that India ever had—to force the introduction of the Roman character into our schools and courts. One great cause of complaint in Poland, Hungary, Schleswig-Holstein and Austrian Italy is the attempt on the part of the conquerors to force their languages on the subject races, by introducing them into the courts of those countries, and a similar course in India, even if confined to the alphabet alone, will, I apprehend, prove a like source of discontent. The Hindus regard their alphabet to be of divine origin (Deva Nágarí) and a gift from the Godhead. With it is associated their religion, their literature, and their ancient glory. To touch it is to meddle with their religion, their past greatness and their cherished recollections. In the case of Austria, Russia and Denmark there is some advantage in prospect. It is a prerogative of Government and a source of power to use its own mother-tongue in the courts established by it, though the main object of dispensation of even-handed justice may not thereby be fully attained. The people of India could understand the object of introducing the English language into our courts, though they would feel the injustice of sacrificing the interest of the million for the convenience of a few officials. But they cannot but think it a gratuitous and vexatious interference with their language, to force upon them an alphabet which is avowedly unfit to represent its system of phonology, and that merely for the sake of an idea. Give them what is good for them, and they will receive it with thankfulness. Offer them the English language and

they will learn it with all their might and main, for they know it enables them to have intercourse with their governors, and opens the way to wealth and power ; but they cannot perceive that changing their own ancient and superior alphabet for a defective one, can do them any good, and they will have none of it. The interference of Government in such a case cannot but prove mischievous, for were the Government even to confine its patronage of the Latin character to printing vernacular books in it and giving them a wide circulation, it would still displease its subjects, for, preternaturally suspicious as they are, they cannot but look upon such a measure as an act of antagonism against their ancient literature, while it will divert to a useless channel a portion of the limited resources of the education department. The Germans are more highly civilized and more intelligent than any modern Asiatic race, and yet they have, up to this time, notwithstanding the experience of centuries, failed to appreciate the superiority of the slim Roman to the cumbrous German type. The Hindus cannot but prove infinitely more obtuse. It has been said that a patriotic feeling for their ancient characters prevents the German from adopting the Roman letters. If so, (and most probably it is so,) how much stronger must that feeling be in the Hindus in favour of the alphabet in which is preserved their ancient and much revered Vedas, and which is the repository of all their correspondence, accounts and title-deeds. Teach the Roman character in our vernacular village schools, and you will teach what the pupils will be most anxious to unlearn, for it cannot help them at all in the affairs of their lives for centuries to come, nor keep them *au courant* with the rest of their countrymen. For my part I believe, with Sir Erskine Perry, that " were a legislative enactment to insist, even under penalty of death, upon the use of the Roman character, it could not convert our banias' accounts to round German text."

Grand no doubt is the idea of a universal alphabet and grander still is that of a universal language, but the curse of Babel is still upon us, and neither the one nor the other is practicable.

POSTSCRIPT.

I take this opportunity to express my entire concurrence in the opinion expressed by Capt. Lees, on the reading of my paper in August last, as to the number of non-Hindví or foreign words trace-

able in the Urdu. My estimate of 40 to 50 out of every hundred was founded upon the ordinary run of Urdu books, and is not applicable to the style of some of the works patronised by the late effete courts of Delhi and Lucknow. The percentage of foreign words in those books, is, I readily admit, much higher. But at the same time it will be seen from the subjoined extract from the *Sarúr e Sultáni*, the book to which Capt. Lees particularly drew my attention, that it is not so excessively great as to affect much my general conclusion. I add an extract from the *Fisháneh Ajáëb* which also belongs to the highly Persianised class of writings of the *Sarúr e Sultáni*, and the relative proportion of Hindví and foreign elements in it appears to be as 62 to 38; in the first named book it is 57 to 38, *i. e.* 60 and 64 per cent. respectively. My quotations are, I must acknowledge, taken at random, and there are passages in both the works which are much more Persianised, while there are others which are less so; but on the whole they may be, I believe, taken as fair average specimens, as the facts they yield correspond very closely with the results of my enumeration and classification of the words of several pages of each of the two works. To be exact, it would be necessary to count and classify all the words that occur in them, and even then no satisfactory conclusion could be drawn, owing as much to my own limited knowledge of the Semitic languages as to the doubtful origin of many of the words. It is even likely that my division of the Hindví and foreign words in the short extracts given below will be questioned, but that will not, I believe, alter my position, for I do not depend so much upon the relative proportion of the two elements of the Urdu, as upon its structure and grammar, which I contend is purely Hindví. The verbs *hai*, *thá*, *huá*, *geyá*, *dekhe*, *sunke*, *&c.*, in the extracts are all without exception Hindví; the case affixes *ke*, *ká*, *ki*, *son*, *men*, *&c.*, are likewise Hindví, and so are the pronouns and prepositions, *apne*, *uoh*, *se*, *tak*, *kiá*, *&c.* Take away those case-affixes, verbs and prepositions, and the sentences will crumble down and cease to be sentences. It would not be elegant to say in English "the bouleversing of the escritoire created quite a sensation in the boudoir of the Mademoiselle;" but similar sentences are not rare in first class periodicals and novels, and they afford a fair example of what the Urdu is. Their construction and grammar are English, and though we may call them Galli-

cised we cannot say they are French. No Frenchman would for a moment recognise them as such. English rhetoricians, no doubt and very justly, condemn them, but still they admit them to be English and quote them as specimens of English. Following them, we may call the Urdu, *Persianised* Hindví, but still Hindví and not Persian. In the four Mahomedan Bengálí books, from which extracts are given below, the number of foreign words appear to be quite as large as in the ordinary run of Urdu books, and yet those books are described by their authors to be Bengálí, and translated from the Persian and Urdu expressly for the people of Bengal. Virtually their language is as much the Urdu of Bengal, or Bengálí Urdu, as the Urdu is the Hindví Urdu, or the Urdu of the North-West. If they be taken for distinct languages, I see no reason why the anglicised Hindví in which Englishmen in India say,

E 1 E 2 H 1 E 3 E 4 H 2

" *bearer couchká sámne álmárime pantaloon rakkho,*"

a new language. In it we find no less than four European and only two Hindví words. Similarly the Bengali of our courts, which contains twenty per cent. of English words, would have a fair claim to a distinct rank. The language of Young Bengal again is a patchwork of English nouns and Bengálí verbs, and yet nobody has thought of calling it a distinct language. And if they are not distinct languages, but corruptions and dialectic varieties of one language, the Urdu can hold no higher position.

The colloquial Urdu of the masses contains a smaller admixture of foreign words than the written Urdu, and Capt. Lees is of opinion that it is a distinct dialect independent of the Urdu of our books; to it he applies the term Hindustání. But the principle of this subdivision is open to grave objection. Pressed to its legitimate end, it would justify our dividing every living language into not only two distinct dialects, the written and the colloquial, but to as many dialects as there are orders and ranks of people.

Extract from the Surúr Sultáni, p. 11.

F 5 F 4 H 4 H 3 H 2 H 1 F 3 F 2 F 1

جوشن زرہ گلایا لوہے کو تھا تیز طبیعت کا اولوالعزم جمشید

H 13 H 12 H 11 H 10 H 9 F 7 H 8 F 6 H 7 H 6 H 5

بنایا ریشمي کپڑا ایجاد کیا رعیت کو شاد کیا جس جگہہ زمین

F 12 H 18 H 17 F 11 H 16 F 10 H 15 H 14 F 9 F 8
قابل زراعت ديكهي پاني كا چشمه پايا خلق كو بسايا ديو محكوم
F 16 H 23 H 22 H 21 F 15 F 14 F 13 H 20 H 19
تهے اونسے عمارت مستحكم ايوان محل سراپخته بنوائي ادميون كو
F 22 F 21 H 27 H 26 F 20 F 19 F 18 H 25 H 24 F 17
تركيب سكهائي تخت مرصع جواهر نگار تيار هوا شروع سال كا
F 23 H 36 H 35 H 34 H 33 H 32 H 31 H 30 H 29 H 28
نو روز نام هوا جشن كا سرانجام هوا جب تخت پر جلوس
H 45 H 44 H 43 H 42 H 41 F 25 H 40 H 39 F 24 H 38 H 37
كرے جهانكا عزم هوتا ديو بروئي هوا تخت اوڑا ليجاتے هاتهون
F 27 H 50 F 26 H 49 H 48 H 47 H 46
هانه پونهچاتے سات سي برس سلطنت كي مگر فردوسي درين
F 29 F 28 H 51
سال هنقصد همين رفت كار ندیدند مركه اندران روزگار • يكايك بادهٔ بخوت
H 54 F 35 H 53 F 34 F 33 F 32 H 52 F 31 F 30
كا دماغ مين جوش هوا دفعةً خود فراموش هوا عبديت بهولا
57 F 38 F 37 H 56 H 55 F 36
معبودي كا دعوي كيا شيطان نے رسوا كيا

Extract from the Fisáneh Ajáeb, p. 7.

F 6 F 5 H 6 H 5 H 4 F 4 H 3 H 2 F 3 H 1 F 2 F 1
سبحان الله و بحمدهٔ عجب شهر گلذار هی • هر گلي كوچه دلچسپ
H 17 F 9 H 16 H 15 F 8 H 14 H 13 H 12 F 7 H 11 H 10 H 9 H 8 H 7
باغ و بهار هی • هرشخص اپنے طور پر قطعدار هی • دورويه بازار
F 13 H 22 H 21 F 12 F 11 H 20 H 19 H 18 H 18
كس انداز كا هی • هر دوكان مين سرمايهٔ ناز و نياز كا هی • هر چند
F 15 H 30 H 29 F 14 H 28 H 27 H 26 H 25 H 24 H 31
هر محلے مين جهان كا ساز و سامان مهيا هی • پر اكبري
H 38 F 19 H 37 H 39 F 18 F 17 H 35 H 34 H 33 F 16 H 32 H 32 H 31
دروازے سے چلو جاے اور پكے پل تك كه صراط مستقيم هی • كيا جلسا هی
H 41 F 26 H 40 F 25 F 24 F 23 F 22 F 21 H 39 F 20
نان بائي خوش سليقه شيرمال كباب نان نهاري جهان كي نعمت اس
H 47 F 31 F 30 H 45 F 29 H 44 H 43 F 28 H 47 F 27
ابداريكي جسكي بو باس سے دل طاقت پائے دماغ معطر هو جاے •

* Persian Quotation from Ferdusi.

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H 54 H 53 F 34 H 52 H 51 F 33 H 50 H 49 H 48 F 33 F 32
فرستہ گذرے تو سونگھے • کیسا ھی سیر ھو ذرہ تدبیر ھو دیکھے سے

H 56 H55
بھوک لگ آے •

The following is an extract from the *Iblisnámeh* (p. 1.) The total number of words in it is 58, of which 35 are Bengálí and 23 foreign. Its grammar is pure Bengálí.

F 1 F 2 F 3 B 1 B 2 F 4 B 3 B 4 F 5 B 5 B 6
পহেলাতে বেছমেল্লা, শুরু করি নামে আল্লা, সে নামে ছেপ্ত শুন ২ ভাই।
F 6 F 7 B 7 F 8 F 9 B 8 B 9 B 10 B 11 B 12
আমেল ফাজেল তারে, এরবিতে তরজমা করে, মুর্খলোকে তাহা বোঝেনাই॥
B 13 B 14 F 10 B 15 B 16 B 17 B 18 B 19 B 20 B 21
শুন ভাই বেরাদরি, একারণে বাঙ্গালা করি. লেখি আমি বুঝিবার তরে।
F 11 F 12 B 22 B 23 B 24 B 25 F 13 F 14 B 26 B 27
আরবি ফারছির তরে, কেহনা বুঝিতে পারে, সোকর ছেফত বলে কারে॥
F 15 F 16 B 28 F 16 F 17 F 18 F 19 B 29 B 30 F 20
আল্লার ছেফত যত, থোড়া এয়ছা হকিকত, কেতাব মত করিজে বয়ান।
F 21 F 22 B 31 B 32 B 33 B 34 B 35 F 23
মুরসিদের হুকুমমতে, অবুঝাকে বুঝাইতে, পুথি করি বাঙ্গালা জোবান॥

The following is from the *Kiámatnámeh* (p. 2). The number of Bengálí words in it is 36, that of foreign 16.

B 1 B 2 F 1 B 3 F 2 B 4 F 3 F 4 B 5 F 5
নাজানি কেমন তেদ আছে কেয়ামতে। কি রূপে হাসর খাড়া হবে আখে-
B 6 F 6 B 7 B 8 B 9 B 10 B 11 B 12 B 13 B 14
রেতে॥ বাঙ্গালা জবানে যদি কেহ কহে ভাই। আপনা চক্ষেতে দেখ মনকে
B 15 F 7 F 8 B 16 B 17 B 18 F 9 B 19 B 20 B 21
বুঝাই॥ এয়ছাই তালাস লোগ করে যেথাসেথা। কাহেনি করিয়া কেহ না
B 22 F 10 B 23 B 24 F 11 F 12 B 25 B 26 B 27
করে কবিতা॥ জাহানে অনেক আছে লায়েক কাবেল। বাঙ্গালা করিতে কার
B 28 F 13 F 14 B 29 F 15 B 30 B 31 B 32 B 33 B 34
নাহি ফিরে দেল॥ লোকের খাহেস দেখে ভাবে মনেমনে। কেমনে হইবে
B 35 B 36 F 16
পুথি বাঙ্গালা জবানে॥

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The *Chahárdurvish*, p. 2, which has an admixture of 16 foreign in every 40 Bengali words, proclaims itself to be current Bengálí, translated into it in order that it may be easily understood by the Bengálí public.

চলিত বাঙ্গলায় তাই করিনু তৈয়ার। সকলে বুঝিবে ভাই কারণ ইহার॥

Kázi Safí-uddín, in his preface to the *Kilas ul ambiá*, says

এহাতে নবি ও পয়গম্বরানের কেচ্ছা কোরান সরিফ ও হদিছ হইতে ছাবেত আছে, এক্ষণে এহাকে বাঙ্গলা ভাষায় তরজমা করাইয়া বহুত খরচ করিয়া ছাপাইতেছি।

"It contains accounts of prophets and messengers according to the holy Koran and the Hadith, and now I, having got it translated into Bengálí, print it at a great cost."

The language of the translator, Reza-ullah, will be illustrated by the following extract, in which we have 17 foreign for every 24 Bengálí words.

B 1 F 1 B 2 B 3 F 2 F 3 F 4 B 4 B 5
শুন হো মোমিন ভাই করিয়া খেয়াল। আখেরে সাফৎ তাঁর হইবে
F 5 F 6 F 7 F 8 F 9 F 10 F 11 B 6 B 7
নেহাল॥ মহাম্মদ মোস্তা নবি আলায় হেচ্ছালাম। পয়গম্বরী হৈল তাঁর
B 8 F 12 F 13 F 14 B 9 B 10 B 11 B 12 F 15 B 13
উপরে তামাম॥ নবুওত দরিয়াতে সেই মোতি ভারী। লেখিতে ছেফত তাঁর
B 14 B 15 B 16 B 17 F 16 B 18 B 19 B 20 B 21 B 22
আমি কিবা পারি। আপনা নূরেতে জারে আপে নিরঞ্জনে। প্রথমে করিয়া
F 17 B 23 B 24
পয়দা রাখিল গোপনে॥

EMENDATIONS.

P. 498, line 4. For "*i*, *u* and *ri*" read "*i*, *u* and neuter nouns in *ri*."

P. 498 line 7. For "singular number of words ending in other than *a* is as," read "plural number is *bhyas*."

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N° 1. Town of Khetree with Hill Fort 1200 feet high and 2500 above the sea.

The Mines of Khetree in Rajpootana.—*By Col.* J. C. Brooke.

[*Received 6th April*, 1864.—*Read 4th May*, 1864.]

Khetree is situated at the foot of the Arabullee range of hills, which, running south-west and north-east, divides Rajpootana into two portions, separating the fertile eastern states from the more desert western ones. The Arabullee, commencing south of Oodeypore, and touching the western shores of the fairy lakes of that capital, supports the table-land of Meywar, till, opening into numerous spurs, among which dwell the brave and faithful Mhairs, perhaps the only race in India who have accepted the British rule in full and unreserved confidence, it passes Ajmere. From Ajmere the Arabullee tends a little more to the east, dividing Jeypore proper from Shekhawattee, and at the extreme north eastern corner of the latter district, the Arabullee meets the Tourawattee and Ulwar ranges of hills, the direction of which is generally north and south.

At this extreme corner, some lofty spurs occur, on one of which the hill fortress of Khetree above the town of that name, Pl. I., and on another, that of Bagore are placed. The spurs of these hills run south east and north west, at right angles to the main range, which has a south west and north east direction. In these spurs are rich mines of Iron, Copper, Alum and Cobalt, and perhaps other minerals exist, which a careful examination of the rocks may bring to light. Attention must soon be directed to this region, in the prosecution of the search for coal,* which the extension of railways will necessitate, and to judge from the variety and character of the rocks, there are few places deserving of more careful examination than Khetree.

The little state of Khetree is an allodial Fief belonging to a Rajah, but under the sovereignty of Jeypore, to which it pays a quit rent for some of its pergunnahs, of Rs. 80,000 a year. Khetree enjoys a net revenue of about three lakhs a year, of which, however, very little is the produce of the mines.

The town of Khetree contains about 1000 or 1500 houses, among which are those of a few wealthy families, the most notable of whom has constructed a large and magnificent temple at the entrance of the

* No published notice of the Geology of Rajpootana with which we are acquainted, mentions the occurrence of the coal-bearing rocks in Rajpootana.—Eds.

town. The founder of it amassed his wealth in the situation of Commissariat Gomashtah at Cawnpore, on a small salary. Generally speaking, the people of Khetree are poor, partly owing to the lawless character of the Shekhawattee population, which prevents much trade or commercial enterprize, and partly to the oppressions of the various Kamdars and managers during the long minority of the present Rajah.

Amongst the poorest of the Khetree population are the miners. These are of two races, Hindoos and Mussulmans. The Hindoos work the alum and sulphate of copper works, whilst the Mussulmans confine themselves to the ores which require smelting.

The mines, as before remarked, are situated in the small ranges of hills near Khetree. One of the largest of those now worked, though not the most profitable, is the "*Koolhán*" mine, and a description of the process, carried on at this, will suffice as an example of the whole.

The approach to the *Koolhán* mine, about half a mile from the town, is over hills of clay slate, through which granite, iron stone and other rocks have forced themselves. Along the same spur, which runs from Khetree to Singhana, are several other copper mines, intermixed with sulphate of copper and alum mines, which predominate as Singhana is approached.

The entrance to the *Koolhán* mine is 300 feet above the plain below. The mine descends at an angle of about 60° in a zig-zag, but in a very irregular course, and branches off in various directions. Sometimes, for ten or twenty yards, it is only just sufficient to admit the recumbent body of a man, and at others, opens out into considerable chambers, according to the richness of the rock, from which the ore has been not fairly "*worked*," but one may say, "*stolen*." The richest ore, as frequently happens, is at the greatest depth; but there the mine is generally choked with water. This is the great difficulty the miners experience. Their only means of getting rid of the water, in consequence of the tortuous course of the mine, is to form a chain of human beings from the mouth of the mine to the water, along which ghurrahs are passed by hand, filled with water and the rocky debris, which neglect has allowed to accumulate in the mine. This is a slow and expensive process. In one branch of the *Koolhán mine*, no less than 27 people were required for the purpose, and as each occupied as nearly as could be estimated, 8 feet, it gave 216 feet as the depth of the working. The labour of emptying is continued day and night. On

this occasion, upwards of a month had been expended in this primitive and inefficient process, and the cost was about 200 Rupees. To clear the whole mine properly would require about Rs. 2,000, which is a sum, those employed in the trade could ill-afford to lay out.

The richest mines in Khetree are lying useless from being thus choked. There is one especially, the ore from which the miners confidently affirm contains 75 per cent. of pure metal. It is situated near a running stream, and various traders have expended large sums to clear this mine, but hitherto without result.

At Baghore, a fortified hill about 200 feet higher than Khetree, are other mines of copper intermixed with cobalt, the latter alternating in thin layers with the copper.

The copper mines are owned by the miners themselves, whose ancestors discovered them in former times. The larger are managed by a punchayet, on behalf of the mining community, who are descended from the ancient discoverers. Some of the smaller mines are owned by traders, who have bought them up, either from the original discoverers, or else gradually from their descendants, as these have become involved in difficulties, and have pawned or made over their shares to the traders; who pander, for their own interests, to the unthriftiness for which all such men are noted. The larger mines do not appear to have shared this fate.

Each year, after the rainy season the various branches of each mine are put up to "auction" by the punchayet. The *Koolhán* mine has six or seven branches. The miners themselves are the bidders. Each branch of the Koolhan mine sells for from Rs. 50 to 100 a year, and the whole mine fetches from Rs. 400 to Rs. 600, which is a small sum, considering the rich treasures existing in it.

Each branch of the mine is jealously watched by the miner who purchases it, and who hires other miners as laborers on two annas per diem. Were the mine not guarded, these laborers might purloin the ore and sell it.

The miners work in gangs, and a party of eight men, starting in the morning at about 8 o'clock, will bring back from 2½ to 3 maunds of ore by the evening. The ore is brought in small baskets, weighing about 6lbs. each, and is then put up to auction, in the same manner as is done with the ore obtained from the mines still in the hands of the original proprietors, or the traders. The auction takes place at

the town of Khetree itself, and furnishes a scene of much excitement. The purchasers are Mussulman Bhoras, who conduct all the subsequent operations; and here the interest of the miners entirely ceases in the produce of the mines. If the ore is black sulphuret of the first class, it will fetch as much as Rs. 10 per maund of 26½ seers; but if good pyrites, perhaps Rs. 4 or 5 a maund. The pyrites is much the most plentiful ore, but there are several poorer ores fetching as low as Rupee 1 a maund.

The Borah having concluded his purchase, employs a man with a small hammer, who receives Rs. 3 per month, to separate the ore from the schistose rock and quartz, (with which it is intermingled in about equal quantities), and to break it into small pieces.

The ore has now to be finely powdered. This is done by men using 'Ghuns' or heavy hammers, weighing from 32 to 34 pounds each. The hammer is lifted with both hands, one on either side of the hammer head and brought down with great force on a small heap of the ore, raked into place with the toes, that never failing substitute for the hand among natives: as this is the most laborious operation in the whole process, only the strongest men are employed. Pl. II. The ore has to undergo the hammering three times before it is fine enough for the roasting process. A Ghun man on coming to his work very early in the cool of the morning has five maunds of ore weighed out to him, this is his proper quantity for a day's work, and is as much as can be supplied daily by the coarse breaker. Preparing this properly, gives the Ghun laborer six hours of hard unremitting work, and his wages are proportionately high, viz., five rupees a month.

The ore, having been reduced to a proper state, is next mixed with cow-dung, and made into rolls about four inches long, which are first dried in the sun, and then roasted in the open air, in a fire of cow-dung cakes. This is an inexpensive process, costing only a few annas for cakes to roast five maunds of ore.

The ore is now ready for the smelting furnace. For this, Koomhars or potters are employed. The potter builds and works his own furnace, and supplies the bellows; in fact extracts the metal. Four people, one of whom may be a child 12 or 14 years old, are required for each furnace. They receive collectively Rs. 11 a month. The furnace is about 3½ feet high and 12 inches in diameter, built of pieces of slag

No. 8. Koomhar making a smelting Furnace for Copper Ore

cemented with clay in a most primitive manner Pl. III.; and the nozzles of the bellows are built up in it. The nozzles are earthen tubes which are thickest at the furnace end, and at the top of the thick part is a small air hole, usually closed with a piece of wet rag, but opened now and then to clear the tubes. The other end of the tube is fixed to the bellows bag. The bellows valve is formed by two sticks at the mouth, which are opened when the bag is raised for the admission of air, and closed when the bellows are pressed down with force by the bellows men, who use both hands for the purpose. The upper part of the furnace is formed with rings of fire clay, about 10 inches deep. The bellows are worked on three sides, while on the fourth is the opening to the furnace, in which a plate of fire clay is placed, at the lower part of which is a hole for stirring the molten metal and allowing it to flow out. Pl. IV.

The furnace is prepared daily, each smelting occupying about 12 to 14 hours. After the furnace has been lit and well heated, the roasted ore is gradually introduced, alternately with charcoal and the flux which is called "Reet." This is the refuse from old iron furnaces, of which hills of debris still remain, the iron having been worked for ages before the copper ore was discovered. At each operation, five maunds of roasted ore is gradually introduced into the furnace; this requires an equal amount of the "Reet," and four maunds of charcoal to smelt it.

The produce of course varies with the description of ore. The poorest kind, which is sold for eight annas a Khetree maund, and the value of which is doubled by the cleaning and crushing, will produce, at the lowest rate, twenty seers of unrefined copper, which in refining is again reduced one-half, leaving only ten seers. This would make about 303 Tukkas in copper pice.

The expenses may be calculated as follows:—

5 maunds ore, ... Rs.	5	0	0
Hammer-men, ...	0	5	0
4 maunds charcoal at 31 maunds per 12 Rs. ...	1	4	0
5 maunds flux at 20 maunds per rupee, ...	0	4	0
Koombars for smelting $\frac{11}{30}$, ...	0	6	0
Refining, ...	0	8	0
Total, ...	7	11	0

Raj share $\frac{1}{4}$ of 9 rupees,

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The produce will be ten seers as before stated or 303 Tukkas, and deducting ¼th, the share of the Raj, &c., 228 Tukkas worth about Rs. 9 will be left. If we take from this the expenses Rs. 7-11, the net profit will be Rs. 1-5 per diem, but allowing for extras, roasting not charged, etc. we may reckon it at 1 Rupee per diem, when the ore is poor.

There is sometimes a loss in the smelting operations, but the Bohrahs take their chance of this, the gain sometimes being very considerable. On an average it may be reckoned at about 2 rupees on each smelting.

After the ore has been smelted, the metal has to be refined, and the sulphur driven off. This is done by passing a very strong current of heated air over the liquid mass, and constantly skimming it. Pl. V. To obtain the blast a single bellows is used, which is worked by one man opening and drawing it up, and two others pressing it forcibly down with their feet, placing their whole weight on the bellows, and maintaining their balance by means of ropes fastened to the roof of the building.

About one maund is refined at a time, which produces about 20 to 25 seers of good copper. The refining is contracted for at 8 annas the maund. The process requires about three hours, and the men are paid 1½ annas per diem each. When the pot in which the refining has been conducted is ready, the ore is poured into small earthen troughs prepared on the ground for the purpose, and is then taken to the mint for weighment and duty.

The measure at the Khetree mint is the Shahjehanee maund, equal to 36½ seers of the Jeypore maund, but only to 30 seers of the Khetree maund. In the Shahjehanee maund are 1,212 Tukkas or 2,424 pice. Of this, the Khetree Rajah takes 269 Tukkas as his share. Twenty-two Tukkas go to the coiners for their trouble in converting the copper into pice; nine to the Darogah of the mint; two to the weighmen, and four to caste charities; total 306, leaving 906 to the smelter. Twenty-six Tukkas at Khetree sell for the rupee, whereas at Jeypore usually only twenty Tukkas can be procured for the same. The value of 906 Tukkas at Khetree would be Rs. 34-12 nearly.

In some of the mines, a sulphuret of cobalt is found in thin layers, between the masses of copper ore. No great quantity of this is pro-

No. 4. Copper Ore smelting furnace in play.

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duced however, not above 200 lbs. per month in any particular mine. It is merely pounded fine, and exported, and finds its way all over India. It is largely used in enamelling, forming the beautiful blue enamels which native proficients in this art produce. Its price at Khetree itself is Rs. 50 per Jeypore maund of 53 lbs. the Raj share being one-fifth or 10 Rs. per Jeypore maund.

The above is a short description of the rude processes employed in smelting the rich copper ores found in Khetree. The miners are wretchedly poor and ignorant: the mines are choked with rubbish, and worked without system, so that the more valuable ores are not reached: the ore only passes through the furnace once. The metal then separated is the only part kept, but the layer next above the regulus, which is also rich in metal, is thrown away: of this, vast heaps or rather hills exist, both at Khetree and Singhana, and the present furnaces are on these mounds, from which a little enterprize and knowledge would extract a large produce.

There is no means of knowing what the produce of the copper mines would be, if worked on European principles, or whether the fuel, which suffices for the insignificant native works would not soon be exhausted. The fuel is charcoal from the 'phog' plant. It grows freely all over the neighbouring sandy deserts. The 'phog,' on which camels feed freely, is a low succulent plant about a foot and a half high, but the roots of which swell out to a large size and make excellent fuel for all purposes.

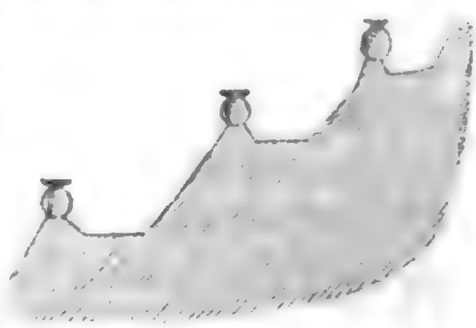
Besides the copper mines at Khetree, the alum mines are deserving of attention. They occur indiscriminately with the former, but the workings are not usually so deep. When the alum and copper ore are in the same mine, the alum and the resultant sulphate of copper, are contracted for, separately from the regular copper ores. The miners who work in the alum mines are Hindoos, whilst those in the copper mines are Mussulmans. Seventy-two houses are employed in the twenty alum works, which are in full operation at Khetree; about double the number are in work at Singhana. In each establishment about six men are employed, on wages varying from Rs. 2 to Rs. 4 a month; the latter being for able bodied men, who can work from 9 o'clock in the morning till a couple of hours after sunset.

Two men go in the morning to the pits, and bring about seven maunds of shale during the course of the day, whilst a couple of others

are employed in breaking it up into small pieces. The broken shale mixed with the crust from the refuse heap, (hereafter alluded to,) is then put into gurrahs till they are half full. The gurrahs previously arranged along the edges of the heap are then filled with water. The whole is turned and mixed three or four times a day by one of the men with a bit of broken gurrah in his hand, so as to expose every part.

At the end of 24 hours, the water, which now holds a considerable quantity of the sulphates in solution, is poured off into other gurrahs, holding a fresh portion of shale, and surface refuse, whilst fresh water is added to the first shale. The operation is repeated a third time with the shale, after which, the latter having parted with a considerable quantity of its sulphates, though not by any means with the whole, (as the shale was at first only coarsely broken and not pounded,) is thrown along the slope of the refuse heap, which is purposely kept smooth and hard.

The refuse heaps Plates VI, VII, are formed as truncated cones and are very regularly and evenly kept; so much so, that they appear as if prepared and kept smooth by a spade. They rise in successive layers to a considerable height, each being less than that below it, by the breadth of terrace left at its base; this terrace is bordered by a low ridge for the gurrahs containing the shale, and which give to the whole so peculiar an appearance. The ridge also serves to retain any water that may be spilt on the terrace, and any rain water, which sinking into the heap, carries portions of the sulphates to the surface slopes, where efflorescence takes place as the heap dries. It is this surface shale which is mixed with the fresh shale from the mines in equal quantities, to form the material with which the gurrahs are charged. The section of a pile would be something like the accompanying figure. Year after year the heap increases by the deposition of half exhausted shale, and many of the existing heaps are formed of the refuse materal accumulated by many generations.



It has been already said that each charge of shale is exposed to three changes of water. The water on the other hand is changed in the gurrahs, till it has taken up, the sulphates from seven different

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No. 6. Alum and Sulphate of Copper works shewing refuse heaps.

No. 7 Alum and Sulphate of [illegible] works showing release heaps (another view

gurrahs. It is now of a thick dirty bluish green colour, and is taken to the boiling house, Plate VIII., where it is boiled in common gurrahs over a fire in choolas, something like those used in kitchen ranges. When the liquor is sufficiently concentrated to string, it is left to cool, and thin sticks being introduced, the sulphate of copper at once separates and crystallizes on them. The mother liquor is then drained off into other gurrahs, as it still contains in solution, a considerable quantity of the sulphate of copper as well as of alumina: it is again boiled down, and treated with nitrate of potash, which causes alum to crystallize at the bottom of the vessel.

The residual liquor still contains a quantity of both sulphates, and is allowed to evaporate in broken gurrahs in the sun, when a considerable quantity of impure and imperfectly crystallized sulphate of copper and alum is left, taking the shape of the bottom of the vessel.

Both the sulphate of copper and the alum require another crystallizing to purify them. The pure sulphate of copper sells at Khetree for Rs. 14 per Khetree maund, the impure for Re. 1. The alum sells for Rs. 4 per maund. Each maund of ore is said to yield $\frac{1}{4}$ of a seer of pure sulphate of copper, $1\frac{1}{4}$ seers of impure ditto and $\frac{1}{4}$ of a seer of alum.

The results of the expenditure and profit of one establishment were as follows.

Seven to eight maunds of shale, to which an equal quantity of the crust from the heap had been added, produced four large gurrahs of good liquor, each weighing 40 to 45 seers. Each gurrah gave 2 seers of sulphates in about equal proportions, and 5 seers of impure residue.

Four seers sulphate copper at 14 Rs. per maund,	Rs.	1	6 5
Four seers alum at 4 Rs. per ditto, ...		0	6 5
Twenty seers impure sulphates at 1 Re. per ditto, ...		0	8 0
Total, ...		2	4 10

Or per month Rs. 69-1, which would be for eight working months Rs. 552-8. From this however, must be deducted the Raj's due, which is $\frac{1}{6}$ of the gross produce, or Rs. 92-1-4, leaving Rs. 460-6-8 per annum to the Bunya.

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The expenses were.

Five maunds wood (at 16 maunds per rupee) and oplah (cow-dung cakes) per diem, say Rs. 8-5-4 per mensem or for 8 months, ...	Rs.	66	10 8
Gurrahs 1 Re. per mensem for 12 months, ...		12	0 0
Baskets, oil, &c., at 8 annas per ditto, ...		6	0 0
Wages to laborers 2 at 4 Rs. and 4 at 2 Rs. per mensem; total per annum, ...		192	0 0
Total of costs, ...		276	10 8
Leaving profit, ...		183	12 0
Total returns, ...		460	6 8

The above shows a profit of 183 rupees a year or 15 rupees a month, but if we allow for festivals, &c., the profit may be stated at 12 rupees a month, and the poor condition of the Bunyas who conduct the works would not induce one to place it at a higher sum.

During the rains, the boiling of course ceases, as the sulphates will not crystallize. At that time the water draining from the lower terraces is poured again and again on the upper ones, to bring to the surface as much as possible of the undissolved sulphates in the heap. On fine days the labourers are employed in storing wood, or in visiting the mines to lay in a stock of shale for operations during the more favourable season.

List of Plates.

I.—Town of Khetree with hill fort.

II.—Pounders of copper ore with 'ghuns.'

III.—Koomhar making a smelting furnace for copper ore.

IV.—Copper smelting furnace in work.

V.—Copper refining furnace with troughs for metal.

VI.—Alum and sulphate of copper works, showing refuse heaps.

VII.—The same, (another view.)

VIII.—Interior of boiling house for alum and sulphate of copper.

No. 8. Interior of Boiling house for Alum and Sulphate of Copper.

LIST OF SPECIMENS FORWARDED.

1*st*.—First class glance ores and copper pyrites.

2*nd*.—Ditto glance ores, sometimes pounded and sold as Soorma (antimony) for the eyes.

3*rd*.—Average copper ores, usually smelted.

4*th*.—Specimen of strata in which the copper ores occur.

5*th*.—Average copper ores freed from rock, before pounding by the "ghun."

6*th*.—Ore mixed with cow-dung and roasted, as put into the smelting furnace.

7*th*.—Slag picked up from mounds, (evidently still containing copper).

8*th*.— Alum shale with sulphate of copper; (average specimen).

9*th*.—Sulphate of copper after first boiling.

10*th*.—Sulphate of copper (purified).

11*th*.—Alum after first boiling.

12*th*.—Ditto, (purified).

13*th*.—Sulphate of iron found in combination with the other sulphates.

14*th*.—Impure residue of alum, sulphate of copper, and nitrate of potash.

15*th*.—Ores, of which the miners desire an analysis.

16*th*.—Fossil wood encrusted with copper ore as dug out of the copper mines.

17*th*.—Cobalt ore, called by natives "Sheta," as found in the mines mixed with copper pyrites.

18*th*.—Ditto, ditto pounded.

In the box in which the above have been sent, are specimens of other ores, having, however, no connection with Khetree or its copper mines, viz.

19*th*.—Zinc ores from zinc mines at Jawur near Oodepoor in Meywar; not now worked. The specimens were struck off the rock in an old working.

20*th*.—Specimens of crude yellow ochre from near the same place.

21*st*.—Choice and beautiful specimens of carbonates and sulphates of lead from the lead mines at Ajmere.

22*nd*.—Antimony from the same mines.

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Note on the hail-storm of Thursday the 24th March.—*By* HENRY F. BLANFORD, *A. R. S. M., F. G. S., Joint Secretary of the Asiatic Society.*

[Received 6th April, 1864.—Read 6th April, 1864.]

The formation of hail is well known to be one of the most obscure phenomena of meteorology, more especially in the case of hail-stones of unusual size, which, from the very circumstances of the case, must be formed within the space of the few seconds succeeding the consolidation of their nuclei, and during which they are falling, in obedience to the law of gravity. In tropical climates, where the temperature at a considerable height from the earth is much above the freezing point, and where nevertheless, some of the largest recorded hail-stones have fallen, the stones must attain their maximum dimensions in the first portion of their fall, and during some subsequent seconds, must be subject to the liquifying influence of the lower and denser strata of the atmosphere. It has appeared to me therefore that a few observations on the stones which fell in Calcutta in a hail-storm on Thursday the 24th ultimo, may be not without interest as a contribution to this branch of Meteorology. For the thermometric, barometric and anemometric observations I am indebted to Col. Thuillier, the Surveyor-General.

The storm commenced about ¼ to 6 in the afternoon, the wind being from the south-east, and for a few minutes previous to the fall blowing in strong intermittent gusts, though not stronger than commonly precede the afternoon showers of this season.* The clouds, a thick mass of nimbus, approached or formed from the north-west, but did not move at any great rate, and indeed they appeared to be stationary during the latter part of the storm. Lightning was frequent, and forked, radiating in zig-zags from a small mass of cloud to those around, and the thunder was frequent and almost continuous, but not loud. Heavy drops of rain began to fall at ¼ to 6, and were soon accompanied by a few hail-stones about the size of hazel nuts. They were not very numerous,

* At the Botanic Gardens, the stillness of which is more favourable to observation than the noise of Chowringhee, Dr. Anderson noticed that the storm was preceded by a prolonged rushing sound, similar to that which would be produced by a number of railway trains rushing by at no great distance. This increased gradually, apparently from the north or north by west, and appeared to pass overhead, before the hail fell. The direction of the hail near the ground was from the south-east.

Fig. 1.

Fig. 2 A.

Fig. 3

Sections of Hailstones Observed on 24th March 1864.

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Sections of Hailstones Observed on 24th March 1864.

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perhaps one or two per square yard per second, and although they increased in frequency and number during the fall, which lasted about half an hour, they were at no time very thick, and were throughout accompanied by rain, which increased in proportion to the hail. As the stones increased in frequency, so also they increased in size, and the largest fell just before the end of the storm.

The form and structure of the stones are noteworthy. They had all of them a more or less oblate or discoid form, some being rudely elliptical in section, while others, and especially the larger, were irregular discs. The exterior was extremely irregular, resembling the extremities of a mass of crystals, but I noticed no regular development of crystalline faces. [It must, however, be remembered that the stones were partially melted at the time of their touching the ground.] The interior (nucleal portion) as seen in a fracture or a partially melted stone, fig. 2*a*. Pl. I. was formed by alternating opaque concentric bands (of which in one case I distinguished 7) separated by rings of less opacity, and the outer portion consisted of transparent ice containing numerous air-bubbles.* The air bubble which escaped from the largest of these when the stone was melted under water was as nearly as large as a grain of mignonette seed. The arrangement of the air bubbles was irregularly radiate. Many of the more discoid stones exhibited deep depressions, almost amounting to holes, in their axis, as shown in fig. 3.

The largest of the stones which I noticed, are those represented in figs. 1, 2. Pl. I. The dimensions of the latter of these, taken when first picked up, were,—diameter 45 mm. thickness 27 mm. The stone, fig. 4, is represented of its natural size, and its irregularity appears to be due to the coalescence of two nuclei. It is the only one I noticed exhibiting this phenomenon.†

* Dr. Brandis has since furnished me with the accompanying sketches of sections of the stones made by him during the fall. Pl. II. He points out that some had transparent, others opaque nuclei. I may also refer to these sketches as independent evidence of the oblateness of form, which, as I have above observed, characterized most of the stones.

† This must have been due to an oversight on my part, and my having been engaged in sketching the stones, &c. during the last 5 or 10 minutes of the fall. Dr. Partridge who lives only at the distance of a furlong, and Dr. Anderson three miles off, inform me that during the latter part of the fall, the majority of the stones were agglomerated. From their description, these appear not to have been larger than those simple concretions which I have figured. The weight of the largest weighed by Dr. Anderson was 3 drachms. At the reading of the

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The thunder and lightning continued vividly for half an hour or more after the cessation of the fall, but gradually the clouds dissolved, and by 9 o'clock the sky was clear. The wind continued from the south-east for the remainder of the evening.

The fall was very local. At Serampore there was rain but no hail, *(Friend of India)*; at Dum Dum there was no fall simultaneous with that of Calcutta, but a heavy fall occurred about half or three quarters of an hour later, which Mr. Boulnois who left Calcutta after the end of the hail-storm, experienced on the road to Dum Dum (but which did not reach Calcutta). At Koolnah, according to the newspapers, there was also a heavy fall, and a stone is said to have fallen there of 5 seers (10 lbs.) in weight. This, however, wants confirmation. The total fall at Calcutta, as estimated by the lower Rain guage at the Surveyor General's Observatory, was 1.22 inches.

It would be a point of some interest to ascertain the direction of the wind, temperature and other meteorological data in the northern parts of Bengal *e. g.* at Moorshedabad, Purneah, Malda, Kissengunj, &c., in order to determine the causes of this interesting hail-fall. Hail, as is remarked by Sir J. Herschel, seems always to depend on the sudden introduction of an extremely cold current of air into the bosom of a quiescent,* nearly saturated mass. Now the dew point at 5 o'clock as calculated by Apjohn's formula from the observed temperatures of the wet and dry bulbs was 84,° the dry bulb thermometer being 86.6. The air was therefore very near saturation, as might be expected of a heated wind, which had recently swept over many hundred miles of a tropical sea. Were such a wind met by a cold current from the Himalaya, we should have the conditions required to produce hail, but in this case we should expect to find some indications of the northerly current in the direction of the wind, and in a lower temperature at some of the northern stations. It is not necessary that the temperature of this current should be below the freezing point. Its collision with the

above paper it was observed by the Honorable Mr. Beadon, and confirmed by other observers, that many of the later stones were very irregular and perfectly transparent lumps of ice. One in particular was described as resembling a double fanged tooth in form, These appeared to be agglomerated stones.

* The air could scarcely be said to be quiescent in this case as previous to the storm and again after its close the south-east wind blew strongly, but this would be checked when met by a strong northerly current, and an ascending current produced,

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southerly current would cause a sudden rise of both into the higher regions of the atmosphere, and if this were very rapid the reduction in the temperature consequent upon the expansion of the heated air, aided by the cooling influence of the northerly current, might, I think, reduce the temperature sufficiently to cause the formation of hail. That such an upward current existed, is, I think, proved by the barometrical reading, which at 6 o'clock (2 hours after the afternoon minimum) gave a reading of 29.712 inches, whereas the corresponding morning reading was 29.811. At the usual period of the afternoon minimum (4 o'clock) the pressure was 29.719, at the morning minimum 29.769.

The clouds were not low during any part of the storm, but it is scarcely probable that the hail was produced in their lower strata. The quantity of rain which accompanied the hail was greater than could well result from the mere partial liquifaction of the hail-stones, and I am inclined therefore to infer, that rain fell from the lower strata of cloud, the formation of hail being confined to the upper portions of the mass.

The uniformly concentric structure of such stones as that delineated in fig. 2*a*, and the air-bubbles of the clear portion, afford interesting indications of the mode of formation of the hail-stones. The clear ice must have been condensed in the fluid form, and have contained a large amount of air in solution, which, as in the formation of lake ice, was squeezed out at the instant of solidification, forming the air-bubbles now entangled. The concentric zones indicate so many atmospheric strata of condensation and it is probable that they consist of radiating snow spicules *i. e.* ice condensed from vapour below the freezing point, and crystallizing on a solid nucleus, instead of forming free flakes. On this view each clear zone represents a portion of the stone formed in an atmosphere above the freezing point, and subsequently frozen, while each opaque zone represents that contributed by an atmosphere below 32°. This would shew a great variability in the upper strata of cloud, but such might result from the eddying of the mingling currents.

The oblate or discoid form of the stones and their axial hollows are more difficult to explain. Were they in rapid rotation, they might indeed acquire the observed form by centrifugal force, but there is no apparent reason why such a motion should be set up. I do not know that a similar observation has been previously recorded, but the prevalence of the phenomenon in the case of the hail-stones in the storm

recorded, prove that it is not accidental, but due to some cause operating generally in their formation.

I bring these remarks forward, in the hope that further observations may be elicited from some of our members or others, on the phenomena of the storm, as well as to draw attention to the importance and interest of this branch of meteorology, in case future storms may afford opportunities of detailed observation.

Observations on keeping Salt-water Fish alive for a considerable time.— *By* Lt.-Col. R. C. Tytler.

[*Received 28th Feb.*, 1864.] [*Read 6th April*, 1864.]

In offering the following observations for publication, I should here remark that they are entirely the result of a great many experiments, made during several months of my stay at Port Blair, and which I am happy to say have been completely successful.

1. If fresh water from the sea be put into a vessel and changed every twelve hours, sea fish will live in it.

2. It requires a quart beer bottle full of sea water, to keep a fish the size of a minnow alive for twelve hours.

3. After twelve hours, the water begins to be offensive, (from the escape of Sulphurretted Hydrogen;) the fish comes to the surface, swims in circles impatiently, and dies before twenty-four hours: the water about this time becomes most offensive.

4. If salt water be put into an iron vessel and boiled over a brisk fire till nothing but the dry salts remain, it will be found that a tea spoonful and a half of this salt, added to a quart beer bottle of fresh tank water, will keep alive a fish the size of a small minnow, for a considerable length of time, without any change of water being required for months: this simple fact took me months and months to arrive at, and it now affords me the greatest pleasure to make the result of my successful experiments known.

5. No food should be given to the fish, beyond a fly or smashed cockroach now and then.

6. Freshly caught fish should be kept in a vessel at least twenty-four hours by themselves, before being placed with those already in the aquarium.

7. To prove how successful the above plan has been, I should here add that I have brought fish alive from Port Blair to Calcutta that had at least been three months in the same water, and the latter was as fresh as possible up to that time.

Observations on a few Species of Geckos alive in the possession of the author.—*By* Lt.-Col. R. C. Tytler.

[*Recieved 27th March*, 1864.]

Port Blair, 1*st January*, 1864.

On several occasions lately, interesting living specimens of Geckoid Lizards have been brought from the jungles, which has induced me to make an attempt to keep them alive, for the purpose of observing their habits more closely, than appears generally to have been done; in order to accomplish this object I have been obliged to resort to many expedients, and the only one that has proved successful has been the following: I have had a great many boxes made of light deal wood, two sides of which are glass: the wooden portion is perforated with holes in every direction, so as to admit of air passing freely through: one of the glass sides forms a slide to allow of the box being opened when an animal is put into it; at one end of the box is a small tin trough for water, similar to that used in Canary cages and at the bottom there is an inch of clean sand: a small branch put into the box for the use of Arboreal species, completes the arrangement, the tin for water is always kept full, and a number of living flies, or young cockroaches are kept loose in the box, and I find that this is sufficient for all the requirements of these Lizards.

My boxes vary in size, but the most convenient are 10 inches by 6, and two inches wide, or 6 inches by 4, also two inches in width; but as the glasses are liable to accidental breakage, I have in a measure contrived to provide for and meet this, by having a separate light wooden box made, capable of holding six of the glass cases: this not only protects the glass, but keeps the freshly caught animal quiet, from being in the dark, and undisturbed, which it greatly prefers; and prevents the restlessness it shews on such occasions in the light.

Without in any way wishing to question the existing classification of saurian animals adopted by naturalists, I feel in the present

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instance, while studying the forms, and closely examining the habits of the geckos now alive in my collection, that it is incumbent on me simply to adopt the genus *Gecko*, for every species in the family, rather than place them in the several genera, enumerated in modern classification. Geckoid lizards bear a strong similarity to each other, and are in themselves unmistakable. One specimen alone is almost sufficient to mark the entire type, notwithstanding that on comparing species, one with another, a marked difference is visible, quite sufficient to distinguish species, but insufficient in my opinion for a division of the genus *Gecko* into genera, to meet alterations caused by size, or slight differences of form. I have therefore adopted the genus *Gecko* for all these lizards in my collection, whose habits I have lately been enabled to observe closely. The word *Gecko*, is evidently taken from the sound, uttered by very many of the species, in which 'yecko,' or 'gecko,' or 'chucko,' is distinctly audible. From the formation of the pupils of their eyes, it will at once be remarked, that they are more or less nocturnal in their habits. In many the pupil strongly resembles that of a cat, when much contracted. In the day, it is contracted to a fine dark hair line, but this is only the case with those which are most nocturnal; others again which are diurnal in their habits, preserve the fullness and rotundity of the pupil in ordinary strong lights: this is the case with my *Gecko chameleon* (*Phelsuma Andamanense* of Blyth,) a very beautiful species, peculiar to the Andamans, where it is found in great abundance. The pupil of this species remains round in all lights, and is intensely black; whereas, in my *Gecko pardus*, which, I think, may prove to be *Hemidactylus coctæi* auctorum, the irides, which are of a peculiar bronze and very metallic hue, shew during the day simply a very fine vertical hair-like pupil. Almost all the other small species have the same, but in *Gecko toucktay* of mine, which is *Platydactylus verus*, the irides, which are of a yellowish green, instead of having by day-light a hair-like contracted pupil, have five or six minute unconnected dots vertically arranged, which, on the reduction of light, rapidly increase and connect themselves, forming in the dark a full pupil. This latter I ascertained from a gecko that had died in the dark, the pupil of which I found to be fully developed and round. Geckos seem to feed entirely on insects; the localities which they frequent therefore, are those best suited to the description of insects they feed on, for capturing which, nature

has given them remarkable peculiarities, admirably adapting them for capturing their prey. I allude to the extraordinary power they possess of changing their colours, so as to adapt themselves to the various localities which they frequent, and by which their complete concealment is effected. In *Gecko Chameleon* for instance, when in dark places, or in the earlier part of the day, the colour is almost black with red markings, and this remains under ordinary circumstances till nearly midday, when a gradual change takes place, and the dark hue gives way to an intense emerald green on the body, with a bright blue on the tail, the under surface becoming of a fine canary yellow, and the red marks still remaining on the back. By one or two o'clock, the change of colour is complete, and the animal sallies forth from his dark place of concealment, on to the bright green leaves of trees, in quest of insects: but the change of colour may take place at any time during the day, according to circumstances of position and light; for if one of the green coloured lizards be placed in a dark spot, the colour changes to a dark hue, in the same ratio that the dark animal becomes green when placed in the sun, or in a strong light on the leaves of trees. The change of colour is also influenced by the seasons, for during the rains the change is not so rapid as it is in brighter weather.

The casting of the skin is of frequent occurrence with all the Geckos, but particularly so with *Gecko Chameleon*, and, strange to say, other lizards in the same case, devour the skin as soon as it is cast: in many instances I have even seen them tear it off before it was fairly changed. All Geckos are great water-drinkers; they drink by lapping with their tongues like dogs; it is therefore very necessary to keep the little tin trough in their cage constantly supplied with water. Insects should also be kept in their boxes to satisfy their voracious appetites. Though insect-eaters, and at times greedy and voracious, still they are capable of enduring hunger for a considerable length of time, without seeming to suffer any inconvenience from it. One of the most marvellous traits in the habit of the Gecko, is its power of frequently and most rapidly changing its colour, and also its markings, to suit the places it may be in; I have seen an animal become, from a light straw-colour, speckled all over with dark marks; and perhaps in another instant of time almost black or a light slate. No chameleon can change more rapidly or perfectly than the gecko. In *Gecko chameleon*, the change is more apparent and striking, owing simply to the contrast between an almost

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black color and a brilliant light emerald green, but this change is not more remarkable than that which takes place in the more humbly coloured species; for in many, not only the general colour changes, but brilliant markings suddenly appear, which were previously invisible. An animal which is of a dull grey and transparent, and without any apparent markings, when examined in one of my boxes and held up to a strong light, may, when placed in a more subdued light, assume a brilliant tortoise shell hue, or a light straw, or perhaps become nearly black: such extremes and differences in colour are truly surprising.

Most Geckos have five distinct toes. The thumb is more or less defined, and the toes are furnished with or are without sucking pads, possessing more or less adhesive powers; those which have the pads less developed, or confined to the tips of their toes, find greater difficulty in ascending plane vertical surfaces than those which have the suckers fully developed. In some of the small species which frequent walls, a membrane unites the toes, while others possess membranes on the sides of their tails, heads and bodies; according to which characters the group is separated into several genera. A peculiarity in the claw of the gecko is its powerful retractility, which in some species is not confined to the claw, but is in a great measure possessed by the entire toe: the sucking pad is even capable of reduction, either by a folding process or an internal retraction. Another strange peculiarity is in the eye, which is furnished with a transparent case, behind which, the eye moves freely and rapidly.

In casting their skins, the portion over the face draws off from the nose towards the *occiput*, leaving the case of the eye, in some, unchanged. This, it will be perceived, is different from the process which obtains in the case of a snake when casting its skin, for in the latter case, the case over the eye is invariably renewed with the skin. I have already alluded to Geckos being entirely insect-eaters, and they are active insect-destroyers; but for all that, they are remarkably choice in the selection of their prey, as they may be seen for a considerable length of time, perfectly motionless on a wall, watching some particular insect they may have selected for their food; and they will, in the meantime, allow numbers of others to pass their very mouths, without making the slightest effort to secure them. Flies and cockroaches form a very favourite food, but the insect must be alive, or they will not touch it.

In collecting lizards, I always send natives out with wide mouthed bottles to put them into when caught, but this, simple as it appears, requires a little management and caution, for should a cork be put into the bottle, the animal is apt to die from suffocation, and putting too many in a bottle, causes perhaps the destruction of the whole; besides which, it often occurs, that a lizard may adhere to the side of the bottle, and shew great disinclination to quit it; the violent shaking then resorted to, to oblige it to do so, frequently causes the animal to die in a few days from its injuries it suffers. I find it is also a bad plan, to allow an injured gecko to be with others, for the skin being once rubbed off, the surface remains raw and tender for some considerable time; and the result too frequently is, that small ants are attracted, who will completely destroy a box of geckos in a night, by adhering to every one they can get hold of, and stinging it to death. This has happened to me on several occasions, and caution is required to guard against it, for the gecko, though an insect-destroyer, is a very timid animal, and rapidly flees from the attacks of insects.

During the day, geckoid lizards are found under stones or in boxes, and other suitable localities, but at night, a lamp near a wall will always attract them, whilst the insects fluttering about will always induce them to remain about the spot. Many of my most interesting specimens have been obtained in this manner. On such occasions, it it is not unusual to observe, the interesting, though at the same time, somewhat cruel habit of the larger sized geckos, destroying the smaller ones; and it almost invariably occurs, that if a large gecko is gently driven towards a small one, whilst on a wall, he almost immediately seizes the other, and a scuffle ensues, which ends either in the total destruction of the smaller one, or at all events the loss of his tail. Nature appears to have provided against this act of cannibalism amongst them, for the tail is easily detached, and although it becomes the trophy of the larger animal, its loss frequently enables the smaller one to escape with his life. The tail when detached, from a most sluggish appendage, becomes a very lively member, and owing to a powerful muscular action, wriggles about for a very considerable time. In about three weeks the tail is renewed on the tail-less animal. From the readiness with which the tail is detached, it almost appears that its rejection is voluntary, and resorted to to aid its possessor in escaping from imminent danger; but this can hardly be the case, for

it often happens that the renewed tail is deformed, either by being thicker at the junction, or, in many instances, by several tails branching off from that one spot.

The toe-pads or suckers are a perpetual source of care and attention to these little animals, who constantly keep licking them with their fleshy tongues, and removing all impediments to their adhesiveness; this takes place from the moment they are caught; the mere act of catching them appears to derange, in some measure, the regularity of their suckers; for when first captured, the animal remains perfectly quiet, as if astonished or paralysed, but on recovering from the effects of his surprise, he licks his pads, examining them minutely, and struggles violently to escape, and even endeavours to bite his captor; which latter, should he succeed in doing, is of but little consequence, as his bite is not in any way venomous.

The *Gecko toucktay* is considered by the Burmese, to be poisonous, though unfoundedly; and therefore this harmless lizard is looked upon with dread and alarm, though, strange to say, his startling and somewhat unearthly call, uttered on a dark still night, from some densely wooded spot, or interior of a house, creates little or no annoyance. The call of the *toucktay* is a frequent repetition of the word 'touck tay,' uttered in a hoarse sonorous and loud tone, repeated five or six times, and ending in a suppressed groan, as if his efforts were entirely exhausted.

Though some few geckos are more or less furnished with an interdigital membrane, bearing the appearance of a swimming web, I have never seen them voluntarily take to the water, but they confine themselves to trees, rocks and houses. It is possible, however, that during heavy rains, when water accumulates in different places, these animals may have to swim in order to save their lives, in which case these membranes must materially assist them in so doing.

Geckos preserved and sent to museums in spirits for scientific purposes, undoubtedly answer all that is required for the examination of their structure, but as most of them have the power of changing their colour, and as in many instances preserved specimens lose some of their peculiarities, I find that to study and form an idea of the habits of these little creatures, it is necessary to examine and watch them in their living state, when they will be found to afford a highly interesting study, very astonish-

ing, and of a very pleasing nature. The larger *saurians*, from their imposing size, have rendered themselves familiar to many, but the little gecko has seemingly been neglected, though constantly put into bottles indiscriminately, and sent to museums with little or nothing said about its habits, beyond a casual remark of its being found on walls or trees, and apparently an insect-eater. In reality little or nothing is known of the habits of Geckos, and these can only be ascertained by taking an interest in these minute creatures, and keeping them in a glass box for constant examination.

The *Gecko toucktay* is a very savage animal when first caught; and as he dashes with the greatest ferocity to bite his captor, his huge gaping mouth and ferocious aspect render him a somewhat alarming as well as forbidding animal to look at, notwithstanding the pretty red, white and slate-coloured markings he has over his body.

I find that *Geckos* which have spines on their tails, on losing the tail and the same being renewed, have the newly formed tail smooth for a considerable length of time, nor do the spikes appear for at least three weeks or a month after its formation. When at rest, the gecko coils his tail, so as to be entirely concealed in the crevice or other place he happens to be in; but when in search of food, or disturbed, the tail remains at its full stretch, and in a certain measure assists him in adhering to walls or other places, as well as to guide him in his movements. When a gecko loses his tail, he appears to be much inconvenienced by the loss, for instead of creeping gracefully and leisurely as he generally does, his movements become short leaps, or a succession of rapid running jerks with his head elevated.

On seizing an insect, the gecko does not use his tongue, but seizes his prey with his jaws, and after a few bites and gulps swallows it without tearing it to pieces. The tongue of the gecko is large and fleshy, and rounded or notched at its extremity, which is free. The teeth, which are very small, are sharp with cutting edges, and numerous, adhering to the internal margin of the jaws, but there are no palatine teeth. A curious and somewhat strange peculiarity in these lizards, is that on being caught they pass a quantity of urine, which is evidently not the result of alarm, but it seems as if this is resorted to for the purpose of aiding them in their escape when seized by other animals. The liquid is quite clear, and although plentifully passed on the seizure of the animal, it is often ejected when not

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disturbed. That this liquid is capable of producing sores on a tender skin, I doubt not; for when my fingers have been touched by it, on several occasions, I have felt an unusual caustic sensation and even a tingling at the tips, which after the lapse of a few minutes entirely passes away.

In a *gecko toucktay* brought to me at Moulmein, and which had been put alive into a dry bottle, I was astonished to see the amount of moisture collected in the bottle in a few hours, as well as the water which seemed to be coming through the pores of the skin; for though the greatest portion had been passed during the night, moisture was still passing through the pores of the skin in the morning.

I find whenever my specimens of the *gecko tidæ* are in bad health or about to die, a gradual wearing away is visible; the neck becomes very thin and dilated, the head looks unusually large, the lips swell and become sore, the eyes much projected; particles of dust also adhere to the transparent, immovable eyelid, and about the corners of the mouth, which latter often fills with dust; when this occurs they seldom or ever recover. The presence of dust on the immovable eyelid, is in itself a marked indication of approaching death, for geckos constantly lick it with their tongues, and keep it scrupulously clean when in health. The living animals in the same box do not in any way seem to shew repugnance at the presence of a dead companion, but move about it, or cluster around it precisely as if it were alive. The clustering of these animals, when not confined in a box, is not unusual, for I have found several concealing themselves in the same crevice, where they sometimes lay one over another. In my glass cases this is a frequent occurrence.

I have already remarked on the constant casting off of the skin, on the part of the *Gecko chameleon*, and although it is less frequent with others, still they all cast their skins often, and in the glass boxes this would appear to occur more frequently than elsewhere: the confinement may perhaps in some measure influence the act, and promote a more rapid change; before it takes place, the animal becomes unusually languid and of a grey slate colour, appearing in certain lights of a whitish hue. As the time of casting approaches, the grey colour becomes darker and duller, all markings disappear, and the skin begins to crack and fall off, either in one or several long pieces; that of the tail being the last, which slips off like a long sheath. Other *Geckos* in the same box, attracted

by the pure white appearance of this cast off coat, seize and eat it. The skin is of a pure white, beautifully netted and marked, strongly resembling that of snakes. No sooner is the skin cast off, than the little creature becomes quite lively again. A *toucktay* which I had, commenced casting its skin in one of my boxes, two or three days after its capture; on the third day the skin cracked and as usual began to peel off. On this occasion, it was nearly a week getting rid of its skin, but for all that, I do not think it was in any way weakened by the operation, as might reasonably be expected from the animal's sluggishness and refusal of all food. I have observed that geckos on touching shining or polished surfaces, invariably lick them with their tongues, probably mistaking them for water, but the *gecko chameleon* does the same to the small shining particles of sand.

The contraction of the eye of these lizards is remarkably cat-like, but in *gecko toucktay*, it is more remarkable than in any other, from the peculiar greenish hue of the iris, which is so markedly different from the brass bronze lustre, or brown hues of the smaller species. When the mouth of the *toucktay* is open, it is truly hideous, the inside appearing like a deep pink cavern, with the palate black. Although this is equally descriptive of the smaller lizards, it is most striking in the larger ones. Although the *gecko toucktay* is vicious and furious, it soon becomes reconciled to confinement, and does not attack or bite others of the same species, when put into the same box. This huge gecko adheres to a wall, or the perpendicular surface of a pane of glass, as firmly and as securely as the smaller animals, and is almost more tenacious of its hold, requiring a strong shove or even stroke to knock it off a wall: during the day this animal adheres to a wall or tree with his head downwards, or frequently hangs by his hind feet, with the head down and the front feet clasped together.

Other *saurians* may in a great measure be able to cling to, and ascend vertical surfaces, but the power of adhering to such places like a fly, with suckers, and to traverse ceilings with the greatest facility and rapidity, where no other lizard dare venture, belongs exclusively to the gecko. This is effected by means of their flattened and expanded toes, which are transversely laminated beneath, or furnished with powerful imbricated suckers; and by its claws, which are sharp-hooked and retractile like a cat's, and greatly assist the suckers in

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their hold: for they have a clinging capability, which, when added to the suction of their toe-pads, gives the animal a surprisingly powerful hold, the toe-suckers acting in reality like minute air-pumps. I have lately lost a beautiful specimen of the *gecko toucktay*, which, previously lively and active, died suddenly. On a *post mortem* examination, I found in the stomach, an oblong piece of a substance like lime, the size of a marble, and as hard as a stone, and which had evidently caused its death. It is possible that since so many species of the smaller geckos inhabit the same place, hybrids may be of frequent occurrence; and this I have had reason to suspect in many instances: but although several species of geckos may inhabit the same locality, yet, as a general rule, they keep separate and aloof from each other; for instance in a house, the dark cellars may be the resort of one species, the roof of another, and crevices in the walls may be occupied exclusively by a third species. However, at night they issue forth in quest of insects, and may be found mixed up together in the same spot, but on the slightest disturbance, or when they have done feeding, they return hurriedly to their particular hiding-places.

Two eggs of a perfectly round and milk-white colour seem to be the most they lay. These lie about chinks in the wall, unprotected till hatched, which process takes place according to temperature and other circumstances. When the eggs are first laid they are soft, and covered with an adhesive glutinous substance, which causes the eggs to stick to any surface, as well as frequently to each other. Shortly after the eggs are laid, the shell and gluten become perfectly hard, and were it not for this admirable provision of nature, these light minute eggs, would be blown about by every breath of wind, and their hatching would be rendered almost an impossibility, particularly so in the localities their parents intend the young to inhabit. The power the geckos possess of introducing themselves into minute crevices, is owing to the natural flexibility of their bodies, the formation of which is depressed, and covered with imbricate scales or tubercles, and frequently spines like prickles, on the tail as well as on the body. Femoral pores exist in the males or in both sexes, but there are several species in which no indication of these pores can be found. Besides the immoveable case which covers the eye, and behind which the eye moves freely, there is a slightly developed regular eyelid, which, from its incomplete formation, gives a staring glance to the animal, for the eye is itself naturally

very large, full and bright. The orifices of the ears are on the side of the head, with the membrane of the tympanum much depressed.

I have already said that in my classification of the living geckos in my collection, I should simply adopt the genus *Gecko* in preference to the acknowledged genera, but as this may not be satisfactory to others, I will here briefly classify the geckoid saurians. Their position in the zoological series is in the second section *(haplapnoa)* of the class *reptilia ;* in the order *saurii*, tribe *squamati*, and family *ascalobotæ*. This family, in my opinion, admits of only one genus, *Gecko*, but owing to the structure of the feet, the toe-suckers of which vary considerably in form, and are quite a study in themselves, the geckos have been divided into several genera, the principal of which I shall here enumerate.

Lomato-dactylus (Van der Hoven), *Leiurus* (Blyth),
Platydactylus (Cuv.), *Sphæriodactylus* (Cuv.),
Pteropleura (Gray), *Diplodactylus* (Gray),
Hemidactylus (Cuv.), *Ptychozoon* (Kuhl.),
Ptyodactylus (Cuv.), *Crossurus* (Wag.),
Phyllodactylus (Gray), *Stenodactylus* (Fitz.),
Thecadactylus (Dum.), *Gymnodactylus* (Spix.),
Phelsuma (Coct.), *Tarentola*,
Rhacodactylus (Fitz.), *Phyllurus*,

and a great many more, but I think the above may be considered the most important of those hitherto acknowledged : but without specimens of the animals or good illustrations, which latter these brief observations of mine do not admit of, it is totally impossible for me to describe, or convey any idea of the peculiarities existing in the formation of the suckers of the several species.

I will now describe each of my living specimens separately. It is possible that some of them may have been described already, but as I am not aware of any such description and have no means of reference, I will name each myself and give a brief description of it.

1. *Gecko verus ;* length 9 to 12 inches; general colour, dark slate with light ash coloured bands round the body; the light bands are spotted with white, and the dark slate with red spots. The tail is of the length of its body with bands all round it of light and dark slate, divided by dark red or nearly black bands. Irides greenish yellow, large and full of veins. Body compressed, with rough tubercles on the surface, as also on the tail, of a small size. The males are darker than the females, and

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also larger. Toes five, of nearly equal size, furnished with powerful suckers. Head large: pupil of the eye with powerful contracting powers: the eye is large and staring. Inside of the mouth red. Very vicious and bites with great ferocity: inhabits Burmah: my specimens are all from Moulmein. Found in houses, trees, &c., and called by the Burmese *Toucktay*, [*Platydactylus verus* of authors]. The Burmese name is in imitation of its call, which is five or six times repeated.

2. *Gecko Verreauxi*, n. s., Tytler; a splendid large new species found on the main island of the Andamans, as also on the smaller. In size it not only equals the last named species, but is frequently larger, measuring from 13 to 14 inches in length. I have named it after my esteemed friend *M. Jules Verreaux* of Paris, the great and well known naturalist. The *Gecko Verreauxi* is of a dark brown colour above and lighter beneath: those sent to me from Mount Harriet have little or no marking, but those from Aberdeen have dark markings on the back, and sometimes circles on the tail. The body is covered with tubercles, and there are six rows of prickles or spines on the tail; which latter is flat sided. A deep grove runs down the centre of the tail, which is as long as the body. There are two rows of these spines on the top and two on either side of the tail. The animal, in colour, is so like the bark of an old tree or dried wood, and so changes its brown hue to suit the colour of the tree it may be on, that it is a matter of the greatest difficulty to find it. The animal has a very formidable and forbidding look, and the natives greatly dread it, so that it is difficult to obtain. The colour of the irides is a metallic yellowish green, full of veins; the eyes are large and full. Each foot has five large toes with powerful claws and large suckers. The call of this species is a loud '*Tuk Tuk Tuk*' five or six times repeated.

3. *Gecko tigris* (Tytler). I think this is the *Puellula rubida* of Blyth, for the character which induced him to give this generic name to a gecko he received from the Andamans, is perceptible in all my living specimens: I have called it *tigris* from its fierce disposition. In length it is from 5 to 6 inches: general colour brown with numerous dark markings, and rings round the tail: the markings are in the shape of lines. The tail is longer than the body, and when the animal is moving, the tail is held up horizontally and stiff, with a curl at the tip: the back is rough with tubercles, as also is the tail. The under surface is fleshy and smooth and of a purple hue. The upper eyelid with a yellow line on it:

irides of a brownish green. Toes with very minute suckers, scarcely visible, appearing as if none existed: toes five on each foot, long and nearly equal. The colour of the animal is very changeable; a dark variety with deeper markings has been brought to me from Mount Harriet. The species appears to be peculiar to the Andamans, where it is found under stones, stumps of trees, &c.

4. *Gecko Tytleri* n. s. (Tytler); from 4 to 6 inches long; body and tail rough, covered with small tubercles; the tail has also spines on it. Toes five; the thumb small; suckers on the toes small. General colour brown, lighter on the under surface; colour very changeable. Irides brown. Found all my specimens in dark cellars at Moulmein, where the species is common.

5. *Gecko chaus*, (Tytler). I think this is *Hemidactylus frænatus* of Schl. Length from 4 to 5 inches; tail as long as, or longer than body. General colour slate grey, lighter on the under surface; colour very changeable; body smooth with dark marks; tail with spines. Feet with five toes; thumb small; suckers on toes of moderate size. Irides brown. Found on trees, in houses, &c., at Moulmein and Rangoon: those found at Rangoon are somewhat smaller than those from the former place, and a slightly darker variety.

6. *Gecko caracal*, n. s., (Tytler); very similar to the above, but without any spines on the tail; found in dark cellars, but chiefly in native huts at Rangoon. Length about 4 inches. At first from its great similarity to No. 5, *Gecko chaus*, I was inclined to think it was simply a local variety of that animal, but I now feel satisfied it is not so, but a distinct species. It can at once be distinguished from *Gecko chaus* by the absence of prickles or spines on its tail, this latter being perfectly smooth in *Gecko caracal*.

7. *Gecko pardus*, (Tytler); length from 4 to 5 inches; body much compressed; tail flat, thick and fleshy at base, passing off to a fine point. Body dotted with light spots, margined with minute dark spots and specks; general colour brown, very changeable; lower portions lighter, without marks. Irides metallic yellow like brass. Toes five, full size, connected by a membrane; suckers full size. A great variety of markings found in different individuals. Found in houses at Rangoon, Moulmein and Port Blair: those obtained at Port Blair have a thicker tail than those I collected in Burmah. I am of opinion that the Port Blair

animals have been introduced into the settlement in boxes, &c., from Burmah, for I have hitherto only obtained them on Ross island, and not from the main island. I do not think this can be a new species, for it is very common.

8. *Gecko Harrieti*, n. s. (Tytler). This beautiful little Gecko varies in length from 2 to 3 inches. Its general colour is light brown, with particularly pretty, dark markings: a dark mark extends from the nose along the sides, but the colour is so very changeable that it is impossible to describe it: from a light straw, it instantaneously becomes almost of a dark brown. It has five well developed toes, with full sized suckers under each. Irides bright copper colour. Tail equal in length to body. Under portions lighter than upper, without markings. The tail is curled when at rest. It is perfectly arboreal, frequenting trees, and is found concealed under the bark: inhabits the Andamans; all my specimens are from Port Blair and its neighbourhood. I have named it after Mrs. Tytler.

All the Geckos which I have described above, have pupils which contract like those of cats, and are more or less nocturnal in their habits; but the following species is quite diurnal, and the pupil does not seem to contract, but remains round and full all day.

9. *Gecko chameleon* (Tytler.); (*Phelsuma Andamanense* of Blyth); about 4 to 6 inches long: general colour, in the sun or strong light, rich emerald green, with blue or green tail; under portions bright yellow; red marks on head and back in most individuals; in dark places or in a subdued light, the colour is perfectly dark, nearly black; the markings slightly visible and the yellow usual on the under portions entirely disappears. These lizards are quite arboreal. Feet with five toes; thumb very small; suckers of moderate size: tongue bright red. Peculiar to the Andamans, where the species is very common.

*Inscription on the Muqbura at Hailan.**

(Communicated by the Punjab Auxiliary Committee of the Asiatic Society.)

[*Received 16th February, 1864*]

کتبہ جانب شمال بر مزار

نَادِ عَلِيًّا مَظْهَرَ الْعَجَائِبِ تَجِدْهُ عَوْنًا لَكَ فِي النَّوَائِبِ مِنْ كُلِّ هَمٍّ وَ غَمٍّ سَيَنْجَلِي بِفَضْلِكَ يَا اللّٰهُ بِنُبُوَّتِكَ يَا مُحَمَّدُ بِوِلَايَتِكَ يَا عَلِيُّ يَا عَلِيُّ يَا عَلِيُّ •

اَللّٰهُ لَا اِلٰهَ اِلَّا هُوَ الْحَيُّ الْقَيُّوْمُ لَا تَاْخُذُهٗ سِنَةٌ وَّ لَا نَوْمٌ لَهٗ مَا فِي السَّمٰوٰتِ وَ مَا فِي الْاَرْضِ مَنْ ذَا الَّذِيْ يَشْفَعُ عِنْدَهٗ اِلَّا بِاِذْنِهٖ يَعْلَمُ مَا بَيْنَ اَيْدِيْهِمْ وَ مَا خَلْفَهُمْ وَ لَا يُحِيْطُوْنَ بِشَيْءٍ مِنْ عِلْمِهٖ اِلَّا بِمَا شَآءَ وَسِعَ كُرْسِيُّهُ السَّمٰوٰتِ وَ الْاَرْضَ وَ لَا يَئُوْدُهٗ حِفْظُهُمَا وَ هُوَ الْعَلِيُّ الْعَظِيْمُ

اَلَا اِلَى اللّٰهِ تَصِيْرُ الْاُمُوْرُ نَصْرٌ مِنَ اللّٰهِ وَ فَتْحٌ قَرِيْبٌ وَ بَشِّرِ الْمُؤْمِنِيْنَ •

کتبہ بالای مزار جانب سر

مُحَمَّدٌ رَسُوْلُ اللّٰهِ عَلَيْهِ السَّلَامُ •

اوپر کیطرف لکھا ہوا تھا

اَمِيْرُ الْمُؤْمِنِيْنَ اَبُوْ بَكْرِنِ الصِّدِّيْقِ اَمِيْرُ الْمُؤْمِنِيْنَ عُثْمَانَ اِبْنِ عَفَّانِ

نیچی کی طرف

اَمِيْرُ الْمُؤْمِنِيْنَ عُمَرُ الْفَارُوْقُ اَمِيْرُ الْمُؤْمِنِيْنَ عَلِيُّ اِبْنُ اَبِيْ طَالِبٍ اَللّٰهُمَّ اغْفِرْ لِصَاحِبِ الْقَبْرِ •

مزار مرزا مرحوم پر بمقام سر بالای مزار شریف بخط عبرانی مثلث تین خانہ بنا کر لکھا ہوا ہی

* See *ante*, p. 404

کتبہ پہلے خانہ کا

وَمَا تَوْفِيقِي إِلَّا بِاللّٰهِ عَلَيْهِ تَوَكَّلْتُ وَ إِلَيْهِ رَاجِعُونَ •

نہین توفیق مجکو مگر بامداد خدا کے اور اوپر خدا کے توکل کي مین نے اور طرف خدا کي ھی باز گشت •

کتبہ دوسرے خانہ کا

هَذَا الْقَبْرُ لِمَرْحُومِي الْمَغْفُورِ إِلَى اللّٰهِ الْغَنِيِّ الرَّحِيمِ

یہہ قبر مرحومہ بخشي ہوئي کي طرف خدا غني اور رحیم کے

کتبۂ تیسرے خانہ

شَيْخ عَلِي بِيْك ابْنِ حَسَن عَلِي خَان عَرَب •

تحریر بتاریخ شہر رجب سنہ ۹۹۹ ھ

کتبہ بالاي مزار شریف کا یہہ ھی

ترا بکوے اجل ھم گذار خواھد بود
قرار گاہ تو دارالقرار خواھد بود
ترا بہ تختۂ تابوت در کشند روزي
اگر خزانہ و لشکر ھزار خواھد بود
ترا بکنج لحد چون بسی بباید خفت
تن تو طعمۂ ھر مور و مار خواھد بود
مگر کہ کردۂ کردار خود نہان داري
یقین بدان کہ ھمہ آشکار خواھد بود
بسی سوار کہ انجا پیادہ خواھد شد
بسی پیادہ کہ انجا سوار خواھد بود
بدین عمل کہ تو داري بہشت میطلبي
بہشت منزل پرھیز گار خواھد بود
بساز توشۂ رفتن کہ ھمرھان رفتند
کہ سعدي از تو ھمین یاد گار خواھد بود

قطعہ

شبی با فلک گفتم از روي حسرت
کہ اي کار تو سر بسر بی و فائي

بسی دا غها ئی نهي با دل من
گه از دوستانم جدا می نمائي
جوا بی بگو دارم از تو سوا لے
که یا بد دل از قید عالم رها ئي
چه بد تر ز اندوه مرگ آدمي را
بگفتا جد ئي جدائي جدائي

رباعي

اي فلک با من عجب نقشی غریبي ساختي
با مراد خو یش بودم نا مرا د ے ساختي
با مراد خو یش بودم خوا ستم عیش تمام
خا نهٔ عیش مرا ما تم سرا ئی سا ختي

قطعه

فغان زگردش ایام وچرخ نا فر جام
من و ترا ز میان عجب جد انداخت
ترا بملک غریبي مرا بگوشهٔ غم
ترا کجا و من زار را کجا انداخت
امیدوار چنا نم که سر نگون گردد
فلک که طرح جدائي میان ما انداخت

رباعي

شاها بیا که حسن و جوا ني مدام نیست
دایم شراب عیش کسی را بجام نیست
ایک روز خور مي بجهان تا بشام نیست
محبوب در کنار کسی را مدام نیست

رباعي

فلک بکشتن من این قدر شتاب مکن
که خواهم از ستمت مرد اضطراب مکن
فلک بکام تو گر نیست اضطراب مکن
بیک قرار نماند جهان شتاب مکن

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Peculiarities and Uses of the Pillar Towers of the British Islands, by Dr. T. A. Wise.

[*Received 25th March*, 1864.]

So much has been written on the Pillar Towers of the British Islands, and so conflicting are the conclusions drawn, that it may be of use to direct the attention of members of the Asiatic Society, to these remarkable monuments of antiquity, in the expectation of obtaining more correct suggestions than have hitherto been made, regarding their use; as there is a growing belief that they are of Asiatic origin. In the course of the following remarks several examples of Indian Pillar Towers will be mentioned; and it is hoped that photography will afford aid to prove their relationship with those in Europe. Their number must necessarily be few, owing to the lapse of centuries, and to their having been generally destroyed by the persecuting Brahmans; and they will therefore only be found in distant and unfrequented places.

There are no records of the people who built these Towers, or the purposes for which they were built in Ireland and Scotland; and they are so ancient that the most general traditions among the people are that they were the work either of fairies, or the "good people," or "the weird people of the Beghts"; or of saintly old women; or of the Danes, the last conquerors, and cruel devastators of Ireland in ancient times. Without stopping to criticise such fancies, I shall confine myself to a general description of the peculiarities and uses of these remarkable structures, with a few remarks on the probable age in which they were built.

General description.—The graceful outline, and simple style and construction of the Pillar Towers, standing in the solitary waste, or rising unchanged amidst mouldering ruins of churches and tombstones, and their mysterious origin and uses, have long occupied attention, and afforded scope for the ingenuity of antiquarian speculators.

There are 118 of those Pillar Towers in Ireland, and two in Scotland; and they appear to have been constructed by powerful and intelligent missionaries, animated by religious zeal and a sense of security. Such an origin would explain their resemblance to each other, in their graceful form

and peculiar structure. They are from fifty to sixty feet in circumference, and eight or nine in diameter throughout, and are divided into from three to seven or twelve stages, forming apartments of different heights. Their floors are supported in some instances by ridges taken off the thickness of the walls, or by abutments or rests four or six inches in size. In the older Towers, holes are left for the reception of beams to support the floors.

Some of the Pillar Towers have holes in the lintel-stones to receive the hinges of the door. In other Towers the door appears to have been kept shut by a ladder resting upon the opposite wall, and against the closed door; in others again by a bar across the back of the door, the extremities resting in holes behind it, to keep it shut; which fact, with the depth of the floor below the door, prove that security was attended to. The different stages or apartments of the Pillar Towers were reached by a ladder drawn up from the elevated door, and from floor to floor as required, in times of danger. The entrance was from eight to twelve feet from the ground, was generally wider below than above, and flat, or rounded at the top. There were two kinds of windows; those near the top were generally four* in number turned to the cardinal points of the compass, and below these were small oblong openings at intervals, generally in opposite directions, to give light to the different stages of the Tower. Their size, position, and number, vary considerably in different Pillar Towers. The Towers are usually covered with a conical top, sometimes laid with horizontal, and in other cases by herring-bone masonry.

Neither the number of stories, nor the direction of the entrance or windows were of any material importance to the object of the building, as they varied so much in different Towers. The Towers generally resemble each other in the entrance being elevated seven, ten or thirteen feet above the surface of the ground; whereas the floor of the Towers is often three or four feet below the level of the door; and up to this elevation, the Tower is generally solid, sometimes with a projecting ridge of four inches, on the outside, level with the ground. The foundation descends two or three feet below the surface, except where the Tower is built on the solid rock.

* There are nine in the Pillar Tower of Clonmacnoise, and none in that of Dunnonghmore.

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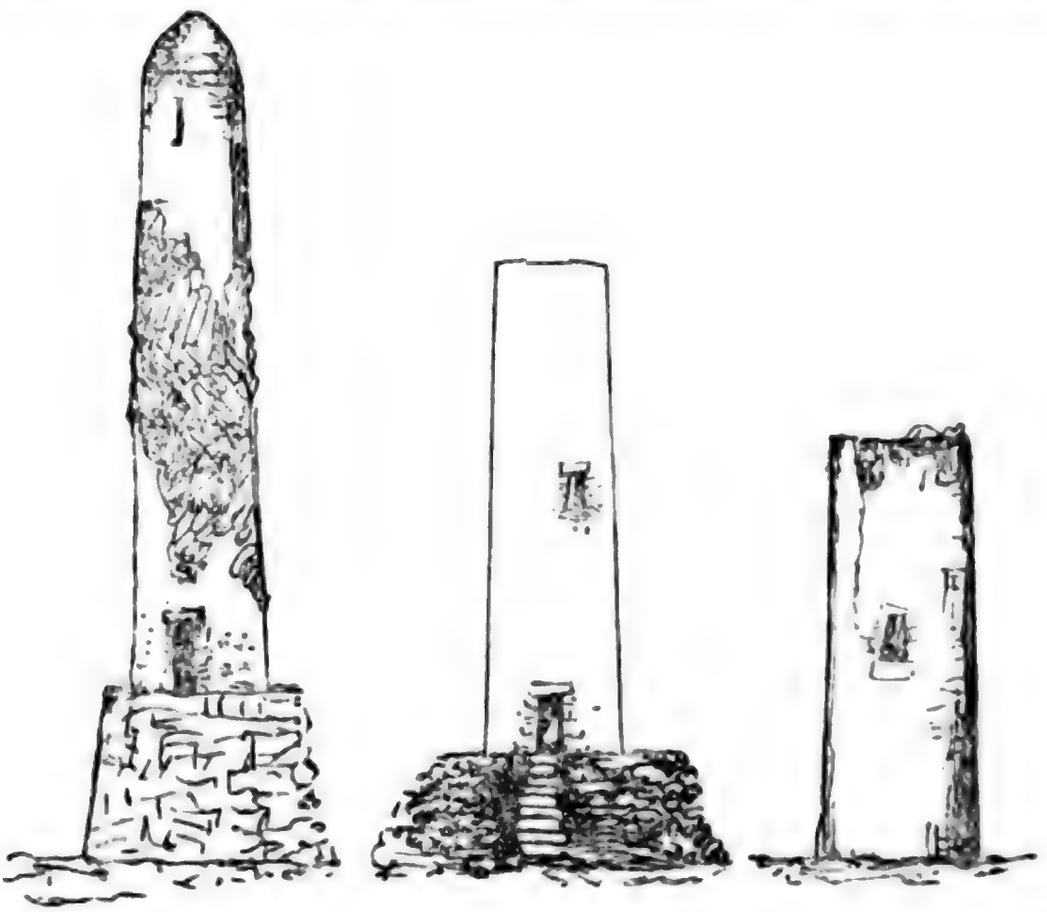
The stones of which the Pillar Towers are built were carefully and judiciously selected, and were often brought from a distance. They are fashioned into an oblong square form, accurately adjusted to each other, and embedded in a small quantity of shell lime,* the interior being common rubble work. The dressed stones are laid in horizontal layers, or in some cases in a somewhat spiral form, rising from the left to the right, in order apparently to add strength to the building.

The Pillar Towers were built by different races of mankind for various purposes; their construction extending over a period of several centuries, which fact will assist us in explaining many of their peculiarities. This has induced me to arrange them as Pagan or primitive, transition or Saxon, and Christian or Norman, which classification will be found more useful, than perhaps, strictly correct.

1. The Irish Pillar Towers of the primitive, early or simple form are few in number, and are more mutilated than the others owing to their age, to the stones having been selected with less care, and to



Clondalken near Dublin. Ross Camk near Galloway. Drumcliff near Sligo.†

* Ulster Journal, vol. I, p. 146.

† A road contractor tried the effects of gunpowder in reducing this venerable tower for road purposes.

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the dressing and arrangement not being so good as in the other classes. Like the early erect stones or obelisks of the North East of Scotland, they were numerous and were erected by Pagan workmen; but they underwent considerable changes as the people advanced in knowledge, social position and religious opinions.

These are examples of the primitive Pillar Towers, which appear to have been erected by Buddhists between the first and the fourth centuries, as is indicated by the sacred symbols of the sun or deity. They were unacquainted with the use of the arch. This is a strong indication of their Asiatic origin: for, amidst the most graceful and splendid remains of Buddhism in Asia, the absence of the arch is most striking. It was with the object of propagating their faith, that the Buddhist Missionaries visited Ireland; and at this early period they would find the country in a rude condition, and governed by numerous chieftains in constant collision with each other, while exposed to the inroads of seafaring robbers: not united enough to resist effectually, but too strong to submit to their tyranny. It was among these turbulent factions that the Buddhists first found it necessary to erect the Pillar Towers, both as a sacred emblem, and as the most simple and effectual means of obtaining personal security, as well as a safe deposit for the sacred relics and most precious effects of their religious worship.

The Chinese Travellers who visited India to study the Buddhist religion, and saw the use to which the Pillar Towers were put, enable us to explain the means employed to call the congregation to their devotions. This was done by the use of cymbals, horns, and drums; and this explains the use to which the brass trumpets were put, which are still sometimes found in the neighbourhood of the Pillar Towers in Ireland.

Besides the Pillar Towers figures of which are given, the following belong to this division: that of Luck in the county of Dublin; those of Tighado, Kildare; and Clones, Monaghan.

The Towers of the second class were constructed during the transition period, and were built by native artists as sacred monuments, and owing to their acquired power, with more care and skill than the primitive towers. This may explain the retention in general of the distinctive form of the earlier edifices, which were intended as safe places of retreat and defence.

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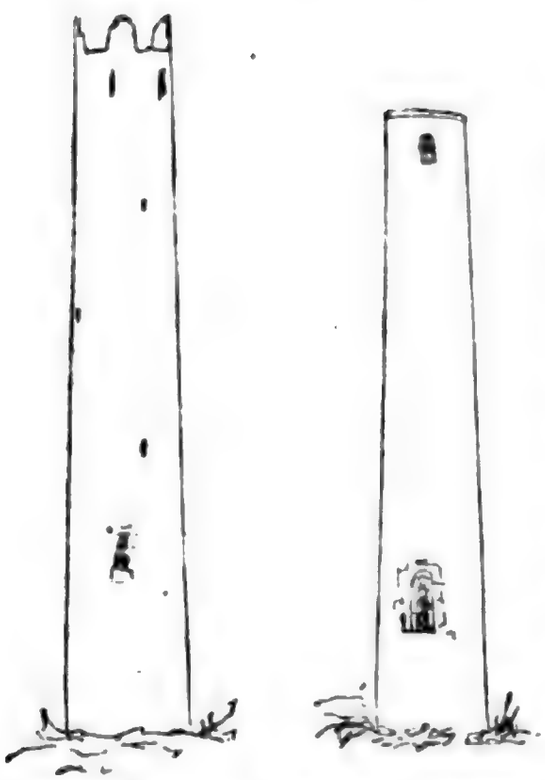

Cloyne, Ireland. Abernethy, Scotland.

The Cloyne Pillar Tower may be instanced as an example of this class. The top of this graceful tower was injured by lightning, and a battlemented top was built upon it. The reddish coloured sandstone of which the tower is built, was obtained in the neighbourhood, and is still in excellent preservation. The curvature of the tower was worked with a chisel-pointed hammer. The stones are large and flat-bedded, and carefully worked into the form required. The thickness of the wall at the door is $3\frac{1}{2}$ feet, and the diameter is 9 feet 2 inches throughout. The door-way looks S E by E. and is $11\frac{1}{2}$ feet from the ground. It is flat topped, being covered with a lintel, and is wider below than above. The tower has six stories; the first being on a level with the door, and the others resting upon ledges projecting from the wall; the height of these chambers is $11\frac{1}{2}$ feet. The four top windows face the cardinal points, and like the door, are broader below than above, in the Pelasgic and Egyptian style. Below, there are several small openings, one of which, over the door, is larger than the others, and has a marked modification of the arch.

Only two round Pillar Towers exist in Scotland. These have the same peculiar form and structure as those of Ireland, appear to have been built at the same early period, and afford good examples of the two varieties already described, while they are surrounded by the same mystery as to their uses.

The following description of the Abernethy tower is extracted from a previous essay of mine.

'Abernethy,* in Fifeshire, was the capital of one of the Pictish Governments, but the Pillar Tower which is situated there is not mentioned in any of our ancient histories. We only know that the people

* The name is derived from *aber* confluence, of the small stream Nethy, that passes down to the town and into the river Earn; and the town is sometimes still called by the Scoto-Irish name *Invernethy*.

were christianised, and the town and adjacent district were dedicated to God and Saint Bridget, in the fifth century (A.D 456)*. It is probable, at this early period, that they followed the heathen custom of worshipping in the open air, (*sub dio*) at sacred stones; for we find in the eighth century (A.D. 711) that Nectan III., King of the Picts, being dissatisfied with the primitive custom of worship, and desirous to follow the Romish ritual, wrote to Ceolfred, Abbot of Jerron, in Northumberland, requesting information regarding certain disputed observances, and asking for architects to build a church, which was to be dedicated to St. Peter, the Prince of the apostles.† The architects were accordingly sent, and the church was built of stone, like that of the Romish church. This has passed away; new churches, and a collegiate establishment formed by the Culdees, and a priory, established in 1273, have disappeared: since then, another very old church has been taken down, and in the beginning of this century, another was built rather remarkable for its superior style of architecture. During these changes, extending over a long period, the Pillar Tower has stood, and is still distinguished by its form, and by the admirable manner in which the material was selected and the building executed.

'The Abernethy Tower stands on a sloping bank, at a short distance from the Ochill hills, and a mile south of the river Tay, near where it joins the Earn. The view from the tower is contracted towards the south by the proximity of the hills, where a beautiful valley stretches southwards; while to the north, there is an extensive prospect of a rich and undulating country, the granary of Scotland, towards which direction the entrance of the tower looks. The building is 75 feet in height, and 48 feet in circumference; and its extreme diameter at the top is 13 feet 9 inches, increasing to the bottom, where it is 15 feet 6 inches; the thickness of the wall at the top being 2 feet 9 inches, and at the bottom 3 feet 7½ inches. The tower is now without a roof, and the coping over the wall is probably modern. It is divided into five stages, each supported by stone abutments. The tower is built of sand-stone, which is now much disintegrated, except on the lower and western side, where there are twelve courses of grey freestone, little changed by exposure to the weather. The stones are all carefully dressed, convex on the exterior, tapering inwards, and concave on their inner

* Innes' *Critical Essays*, vol. 1, pp. 111, 122, 117.
† Bede, L. 5, c. 21.

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surface, to give a circular form to the tower; and they are accurately adjusted in regular courses with but little lime or cement. The doorway is six feet above the base of the tower; but in consequence of the graveyard adjoining having become greatly elevated above the general surface of the soil, the door is now only two feet above the ground. It is 7 feet 9½ inches high, 29 inches in width at the spring of the semicircular arch, and 27½ inches at the base. Four windows near the top of the tower face the cardinal points: they are 3 feet 10½ inches in height, 1 foot 4½ inches in width above, and 1 foot 6½ inches below, and seem to differ from each other in their architectural form. Gordon, in his *Itinerary*, mentions, at the beginning of last century, that "each window is supported by two small pillars;" traces of which are still very evident in one or two of them. Those in the west window are entirely gone. Dr. Wilson supposes* the windows may be modern; but after a careful examination, on the spot, I have come to the conclusion that they were prepared at the same time as the rest of the tower. Besides the four windows, there are three small openings to give light.

'This tower was repaired thirty years ago, when seven human skulls were found within it, lying together. Some of them were of a dark colour, as if they had undergone some process of embalming. Along with these, several long bones were found, some of which had been so recently deposited that they had still their ligaments attached to them.† The tower stands about twenty yards to the SW. of the parish church, which is a modern structure. It is now used as a belfry, and the beadle informed me that it is "pretty well" adapted for this purpose. It also contains the village clock; and the ancient Jouge, or pillory, is attached to it.

'The Pillar-Tower of Abernethy‡ is said to have been built by Nectan III., A. D. 720, in the capital of a Pictish kingdom. The Culdees afterwards had a college there; and in 1273 this was converted into a priory of regular Canons of the Augustine order.'

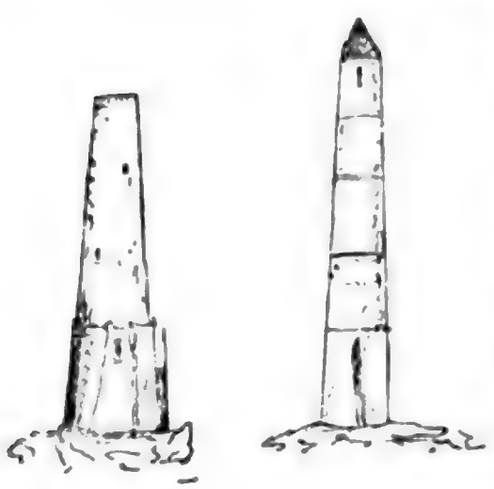
* *Prehistoric Annals*, p. 595.

† Small's *Roman Antiquities of Fife*, p. 154, and Appendix F.

‡ The name which the Highlanders give to Abernethy is *Obair Neachtain*, or *Abair Neachtain*, i. e., "the work of Nectan." This Nectan or Nethan desired architects to be sent to build a church, [see Bede] perhaps that of Abernethy. "Fergustus episcopus Scotiæ Pictus,"—i.e., Fergus, the Pictish bishop of Ireland, was in the Roman general council, A.D. 721—[a Binis, t. 3, quoted by Pinkerton, *Inquiry*, II., 267; see also *Statistical Account of Scotland*, vol. x., p. 435.

To this class belong the Pillar Towers of Agharullee Kilkenny; Kibric, St. Carrice, Kilkenny; Cashel and Roscrea, Tipperary; Castledormor, Kilcallen, Kildare; Fertagh and Kelles, Meath; Swords, Dublin; Furlough, Killala and Meeleck, Mayo; Kilmallock, Limerick; Monasterboice, Louth; Rattoo, Clare; Seven churches, King's county; Keneith, Cork, and Seven churches, Wicklow.

The Pillar Towers being no longer strictly religious edifices, their original form was modified to suit the fancy of the architect and the prevailing style of the period. The graceful Pillar Tower of Ardmore, is built in square-coursed work of reddish sandstone. The courses vary in thickness from 6 to 10 inches, and the inner face of the building is ordinary rubble-work walling. Its external circumference diminishes considerably with the height, and it has three sets-off externally, with weathered string courses, with sets-off internally. The door is 13 feet from the ground and semicircular at top, and diminishes in height and width internally; and the jambs widen below, with a three-inch torus round them, at their outer angle.



Keneith. Ardmore.

The Keneith Tower is built of the slate-stone of the locality; and is very peculiar in its external form, having a hexagonal base; each side of which is 10 feet 4 in. in width, and 20 feet in height. Including the round part, the tower is 50 feet 4 inches in height, and it appears to have been left unfinished; or else a portion of the original top has been destroyed. The Tower is built upon a levelled rock, cropping abruptly from the ground. The door faces the west, and is fourteen feet from the ground. The whole has undergone recent repair, and has been provided with iron stairs to the door, and to each of the four stories, which rest upon ledges left in the thickness of the wall; each compartment is 11 feet and 9 inches in height. The diameter of the Tower contracts as the wall rises; and the breadth of each ledge, four inches, increases the splaying of the wall. There is a small bell in the upper stage, supported by cross beams, but it appears to be unused. The walling of the foundation consists of large rough stones, and the

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selection of the slate stones has been so good, that it is still in good preservation. The marks of the narrow, flat, and slightly concave chisel-hammer are still clean cut in the stone. The floor of this Tower is on a level with the door, and is supported by a flat arch with a well-hole in the centre, proving the advanced state of the arts at the time of its construction: a chamber is thus formed below the level of the door. The whole erection is admirably executed, and cemented with shell-lime, and the general effect is most graceful. This would be much more apparent, but for the ivy which covers the lower part and has already displaced some of the stones. If this ivy is not removed it will endanger the Tower.*

3. In the third, or Anglo-Saxon period, the Christian religion had been introduced into Ireland. It extends from the fifth or sixth to the end of the ninth century; when the primitive churches were made of mud, and wattled as in Britain. As the influence of the priests increased, they absorbed much of the wealth of the country, and brought architects from the continent, whose constructive skill they employed in preparing the first stone edifices, while they enriched their altars with their most precious ornaments, to increase the splendour of their religious rites. This explains why these establishments were so frequently attacked by their unscrupulous neighbours, and the merciless Danish pirates. By the priests, the Pillar Towers of Ireland were found most valuable erections: near them they resided, and took refuge in them with their most valuable effects; thus following the injunction of Pope Gregory to Augustine of Canterbury, in the sixth century, to adopt any thing good from the Pagan places of worship, for Christian purposes; making such additions, as were necessary or convenient. They accordingly not only occupied such as already existed, but partially built some of these useful erections. These latter may be known by their more modern construction, and by their rounded doorways being cut into a series of recesses, the angles of which are slightly rounded off: also by the addition of a moulding, a mere incision upon the face and soffit of the arch. Other of these modern doorways are decorated with the chevron and bead ornament, as in the gold ornaments found in Irish bogs and in some very antique cinerary urns, dug up from old Pagan and Etruscan cairns and tumuli. In some of the Towers, the pediments, and the repeated columns, and successive arches and various mouldings of the doorway

* In the annals of Munster, still in MS., this Tower is said to have been built in 1015, soon after the battle of Clantarff.

Pillar Tower of Cashel

Door

Lower window

Upper window

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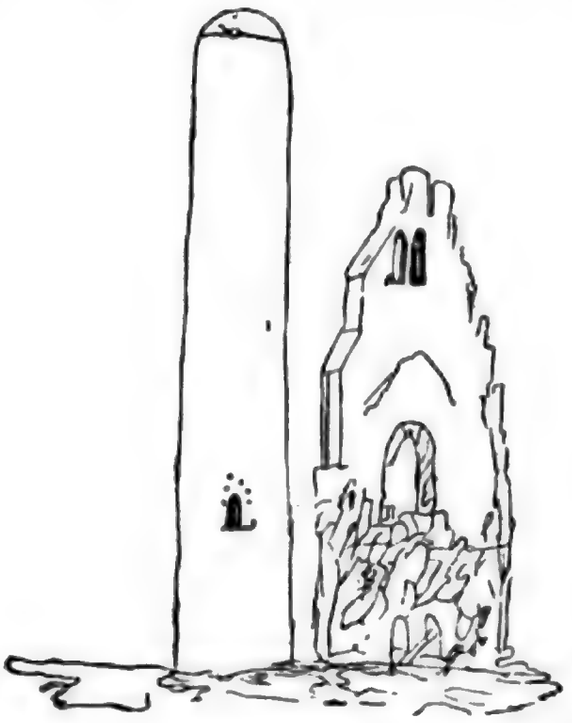
become rich and striking; the latter narrowing as they recede into the wall. The capitals of some of the columns are heads, the hair of which is entwined with snake-like animals; as in the Timahoe, and Kildare, the ornaments of which resemble the rich and elaborate decorations on Cormac's chapel Cashel, executed towards the end of the ninth century. It may be allowed that Norman builders executed these doorways, and decorated them with the ornaments and symbols of their religion, like



Donnaghmore.

McCarthey's church and Pillar Tower, Clonmacnoise.

their churches and other buildings. As they were in the habit of working in sandstone, these ornamented entrances in the Pillar Towers were usually of this stone. So much was this prized, and so marked is the contrast between the entrance and the Tower, that the former is supposed by that able architect, Mr. R. B. Brush, to have been subsequently inserted.

The Donnaghmore Pillar Tower has the ruins of a church and belfry close to it. This having been more modern, and being used as a place of retreat, has the door elevated, and is without the four upper windows. A crucifixion is over the door (page 564,) of this Tower.

McCarthey's church in the N. W. side of the cemetery of Clonmacnoise, is interesting from its having a Pillar Tower built at the same time, of the same stone, and similar in the character of the masonry. Part of the solidity of the Tower was sacrificed to give full

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space to the chaste specimen of the Saxon chancel arch attached to it. This Tower is 55 feet in height, and 7 feet in diameter, and is built with lime. The conical cap is built in the herring-bone style. The door is on a level with the ground, and there are only two small windows near the top, looking to the north and south.

Another Pillar Tower of this class is that of Brechin* in Scotland, and is distinguished for the beauty of the workmanship, and the elegance of its form. It is supposed to have been built in the ninth century; or a century or more earlier than the old church of Brechin, which is supposed to have been founded by Kenneth IV. A. D. 990.† The present church, to which the tower is attached, was added long afterwards.

The Tower of Brechin is built on a gentle elevation, to the north of the old Castle of Brechin, and of the river Esk. It has a contracted view of a fruitful valley on the west; while on the east there is a rich and wide plain, terminating with the Bay of Montrose and the German Ocean.

The stones of which this tower is built have been carefully selected, and formed into square shapes, so modified as to give the circular form to the building; and they are so placed and fitted to each other, for 20 feet from below upwards, and in patches particularly on the east side, as to give a *spiral rising* to the tiers or courses, thus throwing the pressure of the superincumbent mass upon an inclined plane. I am not aware that this remarkable circumstance has ever been observed before; nor does it occur in any of the Irish Round Towers existing. Very little cement had been employed in the building; but the nature of this cement cannot readily be ascertained, as the tower has been thoroughly repaired, and a modern octagon roof erected over it, with angular-headed windows at each of the abutments and spaces, to give it the same architectural character as the modern church, which it joins, and of which it forms the south-west corner. The old tower, previous to the repairs, was eighty-five feet in height: it is now increased by eighteen feet, the height of the new roof. Its extreme circumference at the top is 38 feet 6 inches, sloping outwards to the bottom, where it is 50 feet; the interior diameter at the top is 7 feet 8 inches, at the bottom, 8 feet; the thickness of the wall at the four

* From the Gaelic name Breaichuain, a "brae," or sloping bank.

† Hic est qui tribuit magnam civitatem Brechne domino. Chr. Pict. Kenneth died by treachery (per dolum) A. D. 994. Ulster Annals.

Doorw

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upper windows is 2 feet 10 inches, and at the doorway 4 feet, including the projection of the door-lintels, which is 2 inches.

There are seven openings in this tower. One of these is the doorway, which faces the west; and there are two oblong openings facing the south and east, to afford light to the interior; and four oblong rectangular windows, near the top, facing the cardinal points. Over all these openings are built large stones, and that over the door of the tower is scooped out, so as to give it an arched form. Those which surround the doorway are large blocks of sandstone, more prominent than the other stones of the building, and sculptured with bas-reliefs. That over the door is the crucifixion; and those on the lintels are the supposed figures of St. John and the Virgin Mary. At the side of the bottom of the doorway, are sculptured, on one side, a crouching animal, and on the other, a monstrous griffin;* and the lozenge ornament in the middle of the door-sill appears to have been filled with tracery. The double rows of button-like ornaments surrounding the doorway bear a resemblance to those upon the Inch-brayoc and Brechin sculptured pillar-stones.† All these figures and ornaments are now much defaced by time.‡ The other stones used in the building of the tower are grey-coloured freestone. Many years ago a second entrance was made, leading to the adjoining church, by removing a number of stones from the tower, which weakened it, and which perhaps accounts for "the large mass, in storms of wind, being seen to sway from side to side."§ There are six unequally sized stories, with platforms of wood, resting upon abutments or supports of hewn freestone, each of which projects from six to ten inches, and bears a strong timber floor. The top of the tower is reached by a series of six ladders. The only 'mason-marks' yet discovered in Pillar Towers are in the interior of this building, and have been delineated by Mr. Chalmers.‖ They are often repeated, particularly about the middle, and are generally cut

* Perhaps symbolical of evil. See Eusebius' Life of Constantine, B. 3, ch. 3.

† See *Sculptured stones of Scotland* (Spalding Club,) plates 86 and 138.

‡ This opening was built up in 1847 by order of the Commissioners of Woods and Forests. I am indebted to the accurate Mr. Jervis for this and other particulars.

§ Black's *History of Brechin*, p. 259.

‖ Mr. Chalmers, of Aldbar, was so kind as to allow me the use of a beautiful drawing of the doorway, which is here lithographed on a reduced scale, and which was intended to illustrate a posthumous work of his late able and lamented brother, prepared by the distinguished antiquary Cosmo Innes, Esq.

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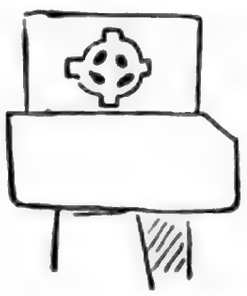
along the whole length and depth of the face of the stone. Unfortunately the stones of the Abernethy Tower are so much disintegrated that, if any such marks ever existed, they are not now to be found. They have not been noticed in the Pillar Towers of Ireland. (*Archæologia*, v. 34. p. 33.) At the time the adjoining church was built, two bells were placed in the Tower; but the situation was found inconvenient, and they were removed.



P. T. Antrim.

Donnaghmore.

Old Church Fore.

The simple cross over the door of the Antrim Pillar Tower proves its Christian origin, and resembles that over the Church of St. Fechen at Fore; this saint died in A. D. 664. The crucifixion over the Donnaghmore and Brechin doorways proves that they were built at a more modern period.

We can suppose that the watcher on the Tower, on the approach of danger, could collect his friends by the horn, drum, or cymbals; and priests, in more peaceable times, could exhibit their relics, and instruct their followers, from the elevated doorway. These suppositions serve to explain the number of the Towers in unsettled countries, and among a turbulent race of people:

To the third variety of Pillar Towers belong Tunahoe, Queen's County; Seven Churches, Smaller Tower Norsida; Kildare, Kildare; Antrim, Antrim; Donnaghmore, Meath; and Brechin, Scotland.

Such are the three classes in which the Irish Pillar Towers may be arranged. The first or original form was most probably erected by Eastern Missionaries, chiefly for religious purposes; and the other two classes were modifications introduced in the course of time, as the buildings were more required as places of defence. As such, they were probably used both before, and after the Buddhist Eastern religion had ceased in the country in which it was first propagated, as they afforded the simplest, and most effectual means of protection; and this explains

their number among turbulent races, as compared with those in more peaceful countries; the few in Scotland compared with the number among the warlike inhabitants of ancient Ireland. They long retained their sacred character, and while used for religious ceremonies, they were found most useful as places of security and defence. There the Priests deposited their most precious effects, as the monks of the present day preserve their books, records, and other valuables in their inaccessible monasteries in Egypt and Syria; on the approach of danger they carry their shrines of gold and silver, and holy relics, into their Towers of safety.

Round Towers which have no connection with religion are found in many countries. In Egypt, where the inhabitants are subject to the depredations of robbers, they resort to such Towers. That

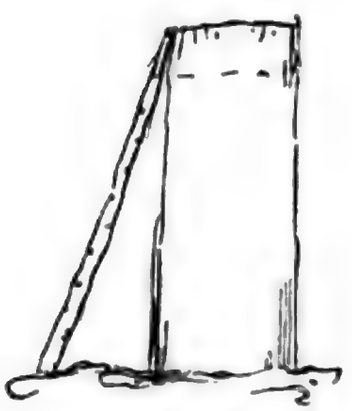


Fig. 1.

Fig. 2.

Fig. 3.

delineated in the margin (Fig. 1) still exists where shepherds hold watch, and in it they deposit all their most valuable goods, with their women and children.* When they have drawn up their rope-ladder they can annoy their enemies with great effect. In border countries where the people were turbulent and warlike, round towers often exist in considerable numbers as the most useful and strongest places of refuge. A good many of them are found on the ghauts, in Hindustan; on the road between Arcot and Bangalore; and skirting the Mysore country. They are from 50 to 60 feet in height, with a door 12 or 15 feet from the ground, reached by means of a ladder: this was drawn up and the door secured. These Towers are often of considerable size, the lower part being used for harbouring cattle. Where the doors are closed, the garrison could easily defend

* L'Egypte Etat modern, quoted by Dr. Kitto.

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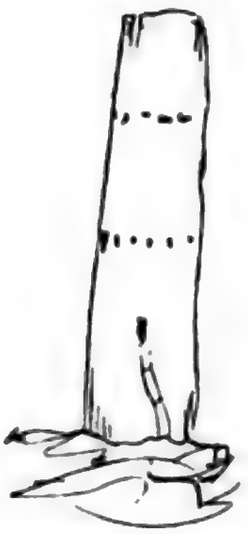
themselves from their enemies armed with bows and arrows, and the like. In the "*Histoire des découvertes dans la Russe et la Perse*," there is an account of many round towers, "said by the inhabitants to be the work of very remote times." At Bulgari there is a round Tower called *Misger*,* according to Pallas. In the midst of the ruins of *Kasimof*, on the *Oha*, which falls into the *Volga*, is a round and elevated Tower called in the language of the country *Misguir*.† In the *Kisti* and *Ingushti*, very ancient nations of the Caucasus, most of the villages have round towers.‡

In Rajputana there were numerous round insulated Towers, thirty or forty feet in height, built on commanding eminences, whence could be descried the approach of enemies from a distance, and from which the garrison were enabled to alarm the country. The only entrance to these Towers was by a small doorway 12 or 15 feet from the ground. This was reached by means of a ladder, which was pulled up in times of danger, and the door closed, and secured; thus out of danger, a few could repel a great many. The enemies most dreaded were Pindaree horsemen; and the Towers afforded a ready and secure retreat to the husbandmen, who could use their matchlocks with great effect from the loop-holes with which the tower was pierced. Even when the door was reached and driven in, the defenders had the different stages to retire to, which thus became so many successive fortresses. Some of these were flanked with breastwork; and such facility did they afford for refuge, and such encouragement to continual warfare, that many of them were destroyed by order of the English Government.§



The late Colonel Stacy met with a characteristic example of the use to which these Towers were often put, in his advance on Cabul from Candahar;—"near the camp, within one hundred yards of the road, on the slope of a hill, there was a small but high Tower, with only one

* A corruption of Muzgi, مزگي which signifies 'to make a holy fire burn bright.' Richardson.

† Guttorn.

‡ Ib. p. 145, referred to by Dr. Petric, p. 29.

§ Cap. Western, B. E. told me he had blown up some thirty or forty, to the great benefit of the inhabitants, as they were no longer required, and they had become harbouring places for robbers.

door about eight feet from the base, in which three men were concealed. They suffered the column, and some of the baggage to pass, and then opened their fire. Fortunately a guard over some stores was passing at the time, and four men were sent up to the Tower, which appeared to have no floor; for they placed a musket inside, pointed upwards, and brought down one of the assailants the first shot. Fearing the others might escape, a fire was kindled in the doorway below, which filled the inside of the tower with smoke, and soon obliged the other two to descend; one was killed close to the door, and the other was shot in attempting to escape.*" So well suited are these towers for defence, that the *Block-houses*, which were erected during the late rebellion in Canada, (1838 and 1839) were upon the same principle—modified so as to be constructed of the materials of the country. In Canada the retreat was supported upon logs of wood, so as to raise the house 8 or 12 feet above the ground. The only entrance was by means of a ladder, which was then drawn up and the trap door closed; and the floor and walls being loop-holed, any one approaching was exposed to musketry.

The Buddhist missionaries changed their symbolical Pillars (lâts) to hollow cylinders or Pillar Towers, to protect their persons and the precious relics which they carried with them to distant countries, and valued so highly. The remains of some of these are still to be found in different parts of Hindostan. Tennent states that the pagodas of Blyars, of the Circars, are chiefly buildings of a cylindrical or 'Round Tower', shape; with their tops either pointed, or truncated at the summit, which frequently bears a round ball on a spike, to represent the sun.† Hanway, in his travels in Persia, states that there are four round temples of the *Guebres*, or worshippers of fire, "about thirty feet in diameter, and about 120 feet in height.‡

The sacred nature of these Pillar Towers in Buddhist countries explains why they are sometimes delineated upon coins, with other sacred objects; as in the accompanying drawing, in which the "*Tower of Deliverance*," and the sacred tree are both represented as springing out

* Narrative of Services, p. 205.
† View of Hindostan, vol. II. p. 123, or vol. VI. p. 133.
‡ Ibid, p. 137.

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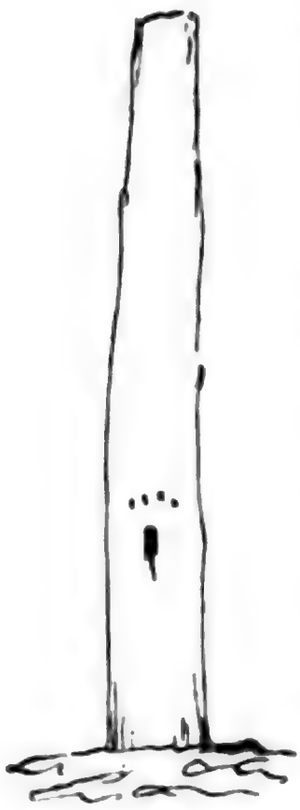

of a sacred pot.* The second figure annexed is that of a Pillar Tower in the Island of Ormus, in the Persian Gulf. Sailors often erroneously consider it to be a light house, without any lantern.†

Near the Tower of safety in former times was the chapel (*urbaria*) or the place of worship, which consisted of a quadrangular building; and the solid cairn (*dagoba*) in which the relic of the body of a saint, or good man, was buried. The Pillar Tower, protected the priests, their most precious effects, and the relics employed in worship. Fa Hian, who travelled in Hindustan in the beginning of the fifth century for the special purpose of studying the Buddhist ritual in its original seat, at the time it was the prevailing religion of India, has left us an interesting account of his travels in that country.‡ He informs us that in his time, as indeed in Buddhist countries of the present day, the relics of the great Buddhist saints, were considered of inestimable value; and when a Temple or city possessed such a treasure, its security was ensured by every possible means. Fa Hian informs us that *Nakie*, a city east of Ghuzni, possessed a portion of the skull of Buddha (*Foe*), for which the king of the country entertained the greatest veneration. The relic was gilded, and covered with the most costly ornaments; and so much afraid was he of its being purloined, that eight chiefs of the principal families of the kingdom, had each a seal, which they set on the gate of the *chapel*, or "*Tower* of deliverance." Early in the morning the eight proceeded to verify the seals, and then opened the gate. On entering, the chief washed his hands, took up the venerated skull-bone of Buddha, conveyed it to the chapel, and secured it, under a bell-

* In Major Cunningham's Bhilsa Topes, Plate 32, No. 2.

† London Illustrated News for 3rd January, 1857

‡ The Journal of this pilgrim was translated from the Chinese by M. M. Remusat, Klaproth and Landresse; and reprinted in Calcutta, in 1848, with interesting notes and illustrations by J. W. Laidlay, Esq.

glass, upon a round stone table, placed on a throne adorned with all kinds of precious ornaments. Every day at sunrise, the attendants of the chapel ascended the pavilion, beat the great drum, sounded the conch, and struck the copper cymbals, to collect the inhabitants for worship. The king, and the assembled people offered up flowers and perfumes, and performed their devotions. Each one, according to his rank, placed the relic upon his head, and then retired to his ordinary occupations. The skull bone was then taken back to the chapel, or 'tower of deliverance' and secured.

The most magnificent tower in the entire continent of India, was constructed by *Foe leon sha*, in honour of Buddha; in this his begging pot was preserved, an indispensable and characteristic utensil of the Buddhist recluse. We are informed that the possession of such a treasure induced the king of *Yueti* to invade the country with a powerful army, to gain possession of this sacred pot.* In this case the tower was a place of great strength: but such was not always the case, as the towers were of various sizes and forms, according to fancy, or the purposes for which they were intended. They had often seven, nine, or twelve stories, corresponding to fortunate numbers, or to the twelve *nidans* or conditions of relative existence. In some cases they were erected on spots made sacred by some holy action, as the receptacle of some relic of a saint. When such a Tower was erected by any one directed "by great faith, and the impulsion of a well directed heart," who then established "the ceremonies and worship," he was promised re-birth among the gods;† the highest state of Buddhist reward in the next world. This tenet is stated to be taken from the sacred book, "of the names and titles of the eight great divine towers." According to this authority, there are upon the earth and in the heavens, a great number of these Towers. This explains why king *Ni Kia* erected a tower upon a sacred spot, more than forty toises high (about 400 English feet); and adorned it with all manner of precious things. So that all who beheld it, and the Temple, admired their beauty and magnificence, to which nothing can be compared.‡

It was considered by the Buddhists to be of the greatest importance to visit and join in worship at the shrines of these sacred Temples.

If such Towers existed in considerable numbers, and of such a size

* Ibid, p. 76. † Ibid, p. 172. ‡ Ibid, p. 74.

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in Hindustan and other countries where the Buddhist religion prevailed, we must expect to find them still remaining. Such is the fact; and a few of them may now be mentioned. Lord Valencia, gives the drawing of two round towers, he saw near Bhaugulpore in Bengal,* which resemble those in Ireland: the door being elevated above the surface of the ground, and the tower provided with four large windows near the summit, and a stone roof.† Captain Smith has delineated another such Tower, which he found at Cole near Allyghur.‡ These Towers were never common among the peaceful inhabitants of Bengal, and many were most probably destroyed by the persecuting Brahmans and fanatical Mahommedan conquerors of Hindustan.

The Buddhists of Hindustan were originally separatists from the Hindu religion, having rejected caste, and the sacred books of the Hindus, &c., while they adopted a pure system of morals, and believed that no good work was equal to that of spreading their religion to the uttermost extremity of the world; and such was the enthusiasm of these Asiatics, that in a few centuries they converted a large portion of the inhabitants of Asia to their faith. They even penetrated at an early period to Africa and Europe; extensive traces of their presence are still found in the British Islands, and a Buddhist community still exists in European Russia.§

In these distant countries, and among such different races of people, they found it necessary to vary their forms and ceremonies, to suit the fancy and circumstances of the people among whom they resided; this explains the contradictory nature of a few of their precepts, and the obscurity of some of their doctrines.

On reaching Europe, the enthusiastic Eastern missionaries soon

* Travels in India.

† These Towers are often referred to, but I have in vain made various efforts, when in the neighbourhood, to procure drawings of them. They are the same referred to by the Marquis of Hastings in his private journal. He states there are two insulated Towers near Bhaugulpore, which have some resemblance to the Round Towers of Ireland; but "they are not above half the height. The door was on a level with the ground. Evidently those which I saw to-day were of no considerable antiquity."* These cannot be considered as examples of the Pillar Towers; and as the late Magistrate of the Bhaugulpore district could not find any trace of them, I suspect his Lordship must have made a hurried sketch, or the engraver took great liberties with the drawing which he got. The late distinguished Jurist E. A. Samuells, C. B., long the able Magistrate of the Bhaugulpore district, could not find any traces of them.

‡ In William Benham's Iberia Celtica, v. 2, p. 200.

§ In Chambers's Journal for August, 1858.

* Vol. I. p. 95.

visited the beautiful British Islands, and at an early period acquired the confidence of the Celtic inhabitants of the North East of Scotland and Ireland. In both these countries many specimens of their architecture exist;—in the engraved stones of Eastern Scotland, and the Pillar Towers of Ireland; to execute which, a religious purpose alone would urge such a population as inhabited Scotland and Ireland, at the time of their erection. These Buddhist missionaries were well known in Europe, and are repeatedly referred to, by the primitive fathers of the Church, in the first centuries of the Christian era. Clement of Alexandria, who lived at the close of the second century, had heard of the monastic practices, and peculiar monuments or topes of the Buddhists. He mentions the Brachmani, and the Sarmani who worship Buddha, or Bouth, whom they honour as a god: and about the middle of the following century, Porphyry repeats information alluding to Buddhist practices, from Bardesanes, who obtained it from Indian envoys sent to Antoninus. "There are," he writes "two divisions of the Gymnosophists, Brachmans and Sarmani." The former are so by birth, the latter by election, consisting of all those who give themselves up to the cultivation of sacred learning; they live in Colleges, in dwellings, and temples constructed by the princes, abandoning their families and property. They are summoned to prayer by the ringing of a bell, and live upon rice and fruits." Cyril of Alexandria mentions that the Samanæans were the philosophers of the Bactrians, showing the extension of Buddhism beyond the confines of India; and St. Jerome, who like Cyril, lived at the end of the fourth and the beginning of the fifth century, was acquainted with Buddhistical legends; for he says that Buddha was believed to have been born of a virgin, and to have come forth from his mother's side. From Cyril of Jerusalem and Ephraim, who wrote in the middle of the fourth century, we learn that Buddhism tainted some of the heresies of the early Christian Church, which the latter terms the Indian heresy. Their accounts demonstrate that the Buddhism of India was known to Christian writers between the second and the fifth century of our era;* but as no *Towers* of *Safety* were erected in any part of Europe, except in Ireland and Scotland, we could not suppose that the primitive Christians were the first architects.

The Pillar Towers were erected by artists from the East, with a

* In H. H. Wilson's Works, v. 2, p. 313, et seq.

degree of skill that has never been surpassed, and at a time when the inhabitants of Ireland and Scotland were in a state of great rudeness. The towers were well adapted for defending their persons and effects from the rapacity of the warlike chiefs among whom they dwelt. From the elevated windows they could descry their enemies; on which they raised the entrance ladder, shut and secured the high door, and gave warning to their friends at a distance.

The able and enthusiastic pagan architects may have refused to construct any other sacred buildings than their sacred Pillar Tower; as they appear to have erected the standing stones only, in the north-east of Scotland. These at first bore only the pagan symbols, to which conquering races afterwards added the symbols of the Christian faith. In like manner in Ireland, at first a sacred pillar was erected, on which the national ornaments and Christian emblems were placed, in a more advanced state of the arts. In no other erections of the earlier period was the same architectural superiority exhibited, as sacred forms were alone considered worthy of the exertions of the architects.

In peaceable times, the missionaries collected their followers by sounding the horn or beating the drum at stated times; and from the elevated doorway, they performed their religious ceremonies and exhorted the people, as they did in Scotland while standing by the side of the sacred erect stones bearing pagan emblems, to which the Christian cross appears to have been afterwards added. It would be difficult to construct any other building that would possess so many advantages as the Pillar Tower.

From the above facts I conclude—

1. That the Pillar Towers were first erected in Asia as a religious symbol; and the form was modified in foreign and unsettled countries in order to afford protection to the persons, the relics, and other valuable effects of the builders.

2. That eastern missionaries erected those sacred symbols in Ireland, as places of refuge and observation, from whence they could alarm their friends by the blast of the horn, the clang of the cymbal and the roll of the drum during the day; and by waving a torch from the apertures at the top of the Tower at night.

3. These Towers were found so useful that they were adopted by conquering races, who decorated them with their national ornaments, and Christian symbols.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

FOR NOVEMBER, 1864.

The Monthly General Meeting of the Asiatic Society of Bengal was held on the 2nd instant.

Baboo Rajendralal Mitra, Vice President, in the Chair.

The Proceedings of the last meeting were read and confirmed.

Presentations were announced—

1. From Baboo Rajendra Mullick, a young Emu, and a mounted specimen of a crown pigeon.

2. From L. B. Bowring, Esq., a photograph of an Inscription on a rock at Taikal.

The following letter accompanied the presentation :—

"BANGALORE, 17TH SEPTEMBER, 1864.

"MY DEAR SIR,—I have the pleasure to send you a photograph of a curious rock inscription at Taikal, a few miles from the Colar Road Station of the Bangalore Branch Railway. It is in Teloogoo, which is the prevailing language in the Colar District of Mysore; but it has been deciphered with difficulty, and the translation given overleaf is rather the general purport than a literal rendering.

"At the time mentioned, 1438 Salivâhan, the Colar country was apparently under the rule of the Anagundi kings, and it is probable that the Deva Raja referred to in the inscription was of that Dynasty.

"Yours truly,

(Signed) "L. B. BOWRING."

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TRANSLATION.

"The order of Deva Raya, the chief ruler, to his next in authority Gopa Raja, son of Kanthappa Raja Wodiar, dated 1438.

Banda Baliaka Naik.

Allarpa Naik.

Bhungeeda Naik.

"These three are counsellors of the said Gopa Raja, their household god being Vardharaj Devaru; they conducted their domestic affairs in the form of a procession in the service of that god.

"At this time it was reported that a tiger had killed a cow in the vicinity. Then a hero, named Pratap Singh, visited Gopa Raja, with his followers, during the procession in honor of the god. At the request of Gopa Raja, he hunted and slew the tiger, for which service Deva Raya, on the recommendation of Gopa Raja, granted to the said Pratap Singh, in the name of the god, 93 wet lands and 13 dry lands near the village of Coomsee."

Under the figure of a Tiger:—

"This shásanam is engraved by Kallukote Tirumallaga. 93 wet lands and 13 dry lands have been granted for slaying the tiger by order of Deva Raya. The said wet and dry lands have been obtained by the favor of Vardharáj Devaru."

3. From J. Beames, Esq., two silver and four copper coins.

4. From C. A. Elliott, Esq., Rubbings of Inscriptions at the foot of some Jain Images in the Hoshungabad district.

Mr. Blanford exhibited some specimens of flint implements of the "early stone period," found at St. Acheul, near Abbeville, which he had lately received from England. He pointed out the resemblance of their general form to that of the stone implements from Madras exhibited a few months since by Mr. Oldham, and gave a brief description of the deposits in which these implements were found. He specially pointed out that the evidence of the immense antiquity of man rested not on mere vague calculations of the rate at which alluvial deposits were formed, as had been recently stated, somewhat dogmatically, by an eminent mathematician, who was evidently but slightly informed on the enormous changes that have been effected in the physical Geography of Western Europe since the formation of the deposits in which these implements were found. To suppose that the

Somme Valley had been hollowed out in a period of six thousand years, or even six thousand years two or three times multiplied, would be utterly at variance with all that we know of the eroding action of rivers; and the Somme Valley only offered one instance out of a great number in which broad river valleys must have been formed since man lived on the earth. Some persons without practical acquaintance with the forms of stones naturally fractured, had doubted whether the flint implements were really of human manufacture, in spite of all the evidence of design afforded by their uniformity, and the number of fractures by which that uniformity had been attained; and the absence of human bones from the deposits containing the flint implements had been much commented on, as being adverse to the view of the human origin of the flint knives. It might be satisfactory, therefore, to such persons to know, that within the last few months a considerable number of human bones, including a human skull of very depressed form, a sacrum, portions of jaws and other bones, had been disinterred from the old flint-knife gravels of Moulin Quignon, not by the questionable agency of workmen, but by M. Boucher des Perthes and a number of French Geologists, whose names were a sufficient guarantee for the genuineness of the discovery. Mr. Blanford concluded by reading a paragraph from the August number of the Annals and Magazine of Natural History, which gave an account of these discoveries.

Mr. Blanford then drew the attention of the Meeting to some portions of a semi-fossil human skull, found some years since, unlabelled and without any note of locality, in the Society's Museum. It consisted of the occipital and parietal bones and a portion of the frontal, with portions of upper and lower jaws, and was filled with a mass of shells of the genus Unio, also semifossilized, and loosely connected together by calcareous infiltration, in a sandy matrix. The Unio was of a living species, but that fact would afford no indication of age, as the fresh water shells which accompany the bones of extinct Mammalia in the Nerbudda alluvium are all of living species. Mr. W. Theobald had found this specimen some years ago in the Museum, shortly after his return from the Nerbudda Valley, and then stated that the matrix of the specimen resembled that of certain of the Nerbudda bone deposits. The specimen had been laid by, and had

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only been refound lately after much search. Mr. Blanford now exhibited it to the Meeting, in the hope that some of the older Members of the Society might be enabled to throw some light on its history. The skull, so far as could be judged from the fragments preserved, was well formed, and not unlike that of some of the recent native skulls in the Society's Museum. Until something was known of its history, no inference could be drawn as to its antiquity.

Mr. Blanford then read to the Meeting a note by Professor John Phillips, of Oxford, on the supposed Spiti fossils in the Oxford Museum, prefacing the reading with the following remarks:—

"It will be remembered by those Members who were present at the December Meeting of the Society last year, that Mr. Oldham read a paper 'on the reputed Spiti fossils,' in the Society's Museum, in which I was called to account for having rejected on insufficient grounds the genuineness of certain of the fossils in that collection, more especially a few species of Ammonites which differed from those forming the majority of the collection in apparent geologic age, as well as in matrix, &c.; while they were absolutely identical in species, matrix, and every other point with the well known Lias fossils from Whitby in Yorkshire. Some of them were figured as forming part of Dr. Gerard's Spiti collection, by Mr. James Prinsep, in the *Gleanings in Science* of 1831, and again in the 18th vol. of the Asiatic Researches; but as this was the only evidence that I could discover of their genuineness, and as similar fossils had not been discovered by any other collectors in Spiti or elsewhere in the North Himalaya, I considered it probable that the specimens in question had been accidentally intermixed with the genuine Spiti fossils subsequent to the receipt of the latter by the Society. Mr. Oldham endeavoured to combat this view by adducing the fact that fossils of the same species and similar in character to those rejected by me existed in the Oxford Museum, where they were labelled as Spiti fossils; and that it was absurd to suppose that a similar accidental intermixture of Whitby and Spiti fossils had taken place at Oxford and Calcutta.

"In replying to Mr. Oldham's remarks, I pointed out that the Oxford specimens could not be received as independent evidence, unless it could be *proved* that they had been despatched by Dr. Gerard to England as an independent series, and under circumstances which

rendered it impossible that the supposed intermixture had been effected prior to their despatch. Admitting the fact that the Oxford fossils had been received in England some time previous to the publication of the 18th Volume of the Asiatic Researches, I stated that I had been unable to find any record of the date of the actual receipt of the fossils by Dr. Buckland, or of that of the Society's series by the Society. If these two dates could be ascertained and compared, it would then be seen whether the evidence of the Oxford fossils could be regarded as that of an independent series or not. I asked Dr. Oldham whether he had any such dates, to which he did not reply at the time, but afterwards rose and said that he had not his notes with him, but that he knew that the Oxford series was received at Oxford before the Asiatic Society had received theirs. Thinking, however, that Dr. Oldham might possibly be mistaken on this head, and with a view, if possible, to settle this very important point of evidence, I wrote to Professor Maskelyne, to ask him to ascertain whether there existed any record of the actual date of receipt of the Spiti fossils at Oxford, and briefly stating the question at issue, which that date was required to decide. Professor Maskelyne very kindly communicated my letter to Professor John Phillips, and the result is the note which I now read to the society.

"'*Notes on Himalayan Fossils in the Museum at Oxford; June 2nd*, 1864. *By Prof. John Phillips.*

'About 30 years since, I sent from York to Calcutta a considerable series of the fossils of Whitby and some other tracts. The specimens were selected from the duplicates of the Yorkshire Philosophical Society, and were presented by that Institution to some individual of position in Calcutia, whose name I cannot remember (it *seems* to me to have been Patterson), but could find out. Whether the collection was carefully kept separate at Calcutta, I know not; but some years afterwards, on being shown in England a specimen of *A. communis* said to be 'from the Himalaya,' I at once conjectured that the Yorkshire collection *might* have given forth this offset so like—so absolutely like—in form, colour, and accompaniments of shale or ironstone. The same astonishing resemblance occurs in regard to these specimens in the Oxford Museum, especially in regard to the *Ammonites communis* and *A. bifrons (Walcottii)*, which are very common at Whitby.

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'On the other hand, the other fossils in this collection do not offer any especial analogy to Yorkshire types; some are of Oxfordian shapes, and of the Belemnite in particular, it is unknown in Yorkshire, but a good deal like some found in the South of England, *as to form*, not, I think, as to conservation, &c.

'Among the fossils we note as of Liassic age, *Ammonites communis*.

'*Ammonites Bifrons (Walcottii)*: such occur at Whitby. The variety of *A. communis* called *crassus*, is found both at Whitby, and in this series, from the Himalaya!

'*Pachyodon Listeri* in plenty. It is not quite like ordinary English specimens.

'Small *Spirifera* of the Liassic type, such as occurs in South of England, not in Yorkshire.

'With this *Spirifera* in *plenty*, occurs:—

'*Rhynchonella* of the types *concinna* and *obsoleta*.

In separate masses, ——

'*Avicula* like *Braamburiensis*.

'*Astarte*.

'*Trigonia* of a type near middle and top of Bath Oolite series, not quite like any English form, and separate.

'*Belemnites* of the group *B. Sulcatus*, Miller, probably of Oxford clay.

'Palœozoic Fossils also occur, including

'*Producta antiquata*.

'*Spirifer* 1.
„ 2.
„ 3. '*Attenuata*

'*Strophomena*.

(Sd.) 'JOHN PHILLIPS,
Oxford.

'2*nd June* 1864.'

"It would appear from this note, that Professor Phillips entertains some doubt on the genuineness of the Oxford fossils, but as he omits to give the date, which is especially required to settle the question, I am still uncertain whether any record of it exists. Dr. Oldham has, however, given us to understand, that he possesses such evidence of the dates both of the receipt of the Society's and of the Oxford collec-

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tions, as will tend to settle the point, and it will materially aid in the elucidation of the question if Dr. Oldham will communicate these, for record in the Society's proceedings, in order that their authenticity may be thoroughly sifted, and the question of genuineness, if possible, thereby set at rest."

Babu Rajendralal Mitra made the following remarks on four undescribed coins, which were exhibited by him.

"Since the last meeting, I have had occasion twice to examine the Cooch Behar trove at the Mint, in order to select a few sets of coins for a friend; and while so employed, I discovered two varieties of coins, which had before escaped my notice. Both of them appear to me to be unknown to numismatologists. I take this opportunity, therefore, to submit them to the inspection of the meeting: one of them has on the obverse the name of one Sultan Ruknuddin Kaikaus, the son of a Sultan, and the grandson of a Sultan; and on the reverse, that of the Khalif Mostasim. The margin of none of the four specimens that I have seen is perfect, but on one of them the words *Sulsh* and *Satamáyá*, or "six hundred and three," are distinct, with a word in the middle, which appears to me to be very like *Tasaayin* or ninety. On a second, the words *Saneh ahad*, "In the year one," are clearly legible, and traces exist of *Tasaayin Satamáyá*. The third specimen has *Tasaayin* or "ninety," the rest being illegible. Reading the dates with the help of each other, I take them to be 691 and 693 respectively. The place of coinage, I read with some doubt to be *Sonargaon*. It follows hence, that the king who issued these coins must have lived in the last decade of the 7th century, and exercised sway either at Delhi or Gour. Now it is well known that Nasiruddin Bagora, the second son of Balban, was in undisputed possession of Bengal from the Hejira year 681 to 698, or A. D. 1282 to 1299; and our Kaikaus, therefore, could not have been a King of Bengal at that time. At Delhi, Ghyasuddin Balban died in the year 1286, leaving his Empire to his grandson, Kai Khusro, son of Muhammad. But his nobles set aside his will, and raised another of his grandsons, Kaikobad, son of Nasiruddin of Bengal, to the throne. That dissolute prince reigned for only three years, and was succeeded by Jellaluddin Firuz, the Khilji, in H. 687, or A. D. 1288. Ziaa-i-Barni, the historian and contemporary of this Firuz, says, that during the last illness of Kaiko-

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bad his Moghal Omrahs got possession of his only son Kaimurs, a boy of three years of age, and proclaimed him King under the title of Shamsuddin. They were, however, unable to maintain their ground, and in three months Firuz mounted the throne, and subsequently caused the young prince to be put to death. This statement has been repeated by all subsequent historians, except the author of the Mirat al'Alum, who, according to Mr. Thomas, changes the name of the prince, from Kaimurs to Kaikaus; and it is to this prince that I feel disposed to assign the coin under notice. Its shape, size, and style of writing are very like those of the coins of Kaikobad, its legend is *mutatis mutandis* the counterpart of that of the other, and its reverse has the name of the Khalif Mostásim, given in identically the same words, as on the coins of Balban and Kaikobad, while there is a strong family likeness in the names of Kaikaus, Kaimurs, Kaikobad and Kai Khusro.

The dates of the coins, however, are opposed to this assignment. The units "one" and "three," are perfectly clear, and they will not admit of our bringing the coins which bear them to the year 687, when Kaimurs was proclaimed king, even if we doubted the term for 90 *(Sasayin)* and read it 80 *(Samanin.)* The title also is opposed to my assignment. According to a contemporary historian, the prenomen of Kaimurs was Shamsuddin, while that of the Kaikaus of our coin is Ruknuddin. These difficulties, however, may be explained away. There are on record several instances in which Muhammadan Sovereigns have appeared under different prenomens at different times, and this may be one of them; and the discrepancy in the dates may be due either to the prince having lived as a fugitive much longer than Ziaa-i-Barni admits, or to a desire on the part of Nasiruddin, Governor of Bengal, to continue his allegiance to his grand son Kaimurs, even after his deposition, and possibly after his death; for he could not readily recognize the usurpation by Firuz of an empire which belonged to his family for three generations. Should this theory of mine be untenable, it will be for others to decide who this prince was, whose coin we have now on hand.

Obv. "Ul Sultan ul A'zam Ruknuddunia-o-din Abu Mozaffar Kaikaus Sultan ibn ul Sultan ibn Sultan." Rev. "Ul imam ul Mustásim, Amir ul momnin Maz Zarb házeh ulsikka Sanch sulsa tasaayin satamaya."

The second coin I have to notice, has the name of one Ali Shah on the obverse. His prenomen was Alauddin, and he calls himself the Alexander of his age, *Sekander uljeman;* I have found several specimens of his coinage, but none sufficiently perfect to give me his date in full. The only word legible is *Sabaamaya*, or "seven hundred." Traces also are visible of a word which may be taken for *arbayin*, or forty, but what the unit was I cannot make out. The place of coinage was Lucknouty. Assuming upon those premises that it is a Bengal coin of the 5th decade of the 7th century, I attribute it to Aly Mubarik, the officer of Kaddar Khan, who proclaimed himself king of Bengal, in 742 Hejira, or A. D. 1342, under the prenomen of Alauddin. He was assassinated, after a reign of a year and five months by his foster brother Hajy Ilias.

The legend on the coin is as follows:—Obv. "Ul Sultan ul Azam Ala ul dunia-o-din Abul Mozaffar Ali Shah ul Sultan." Rev. "Sekander ul jeman ul *** zarb ul Sikka Lakhnauti, Saneh Arbayin * Sabamaya."

I take this opportunity to exhibit two Assam silver coins, placed at my disposal by Col. Guthrie. They bear the names of Surjanáráyana Deva and Surja Deva Chakradhvaja Sinha, with the Saka years 1570, 1575, or A. D. 1648 and 1653. They were the earliest Hindu Kings of Assam, but their dates had hitherto remained unsettled. James Prinsep, following the *Assam Burunji* of Holiráma Dhekial Fukan, placed the first Hindu King of Assam, Chakam or Jayadhvaja Sinha, in the year 1665, with a mark of interrogation after it, and a Chakradhvaja Sinha in 1621, immediately below him.

The *Assam Burunji* of Rádhánátha Bor Borua removes Chuhunmung alias Surjanáráyana the first Hindu Raja, to the year 1497; and then, after two Burmese names, has a Chuhingfa, alias Surjanarayana, who after two Burmese successors was followed by a Chutamla, alias Jayadhvaja Sinha, in 1658, and a Chupangmung, alias Chakradhvaja, in 1663. Chakam, alias Jayadhvaja Sinha, is said to have defeated a general of Aurungzeb, and his era, therefore, must be subsequent to 1658, and he is evidently identical with the Surjadeva Chakradhvaja Sinha of our coin, who commenced his reign before 1653. His immediate predecessor was Surjanáráyana, who was probably the first convert to Hindu faith; for the first prince of that name in Rádhá-

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nátha's history is evidently a mistake. In his coins he invokes both Hari and Hara for his patron divinities.

The legends of the two coins, are, 1st, of Surjanáráyana.

1st Area.—Sri Sri Hari Haracharana paráyanasya.

2nd Area.—Sri Sri Surjanáráyana Devasya Sáke 1570.

2nd, of Surjadeva.

1st Area.—Sri Sri Siva Rámagana paráyanasya.

2nd Area.—Sri Sri Surjadeva Chakradhvaja Sinhasya Sáke 1575.

A letter from Mr. Carlyle, announcing his resignation of the Curatorship, after the Dussehra holidays, which has been accepted by the Council, was recorded.

The following resolution was proposed by the Council, expressive of the Society's recognition of Mr. Blyth's services:—

"On the eve of transferring the Zoological collections of the Society to Government, to form the nucleus of an Imperial Museum of Natural History, the Society wishes to record its sense of the important services rendered by its late Curator, Mr. Blyth, in the formation of those collections. In the period of 22 years, during which Mr. Blyth was Curator of the Society's Museum, he has formed a large and valuable series of specimens, richly illustrative of the Ornithology of India and the Burmese Peninsula, and has added largely to the Mammalian, and other vertebrate collections of the Museum; while by his numerous descriptive papers, and catalogues of the Museum specimens, he has made the materials thus amassed by him subservient to Zoological science at large, and especially valuable to those engaged in the study of the vertebrate faunas of India and its adjoining countries."

The resolution, being put to the vote, was carried unanimously.

Letters from the Rev. J. Cave Browne, Lt. Col. A. Fraser, and Mr. T. Dickens, intimating their desire to withdraw from the Society, were recorded.

The following gentlemen, duly proposed at the last meeting were balloted for, and elected Ordinary Members;—

Baboo Bhoodeb Mookerjee.

H. H. Locke, Esq.

The Hon'ble J. B. Phear.

Lieut. Col W. D. Short, R. E.

C. W. Hatton, Esq.

The following gentlemen were named for ballot, as ordinary members at the next meeting.

W. Anderson, Esq., proposed by Captain W. N. Lees, seconded by Mr. H. F. Blanford.

H. Dunlop, Esq., proposed by Captain W. N. Lees, seconded by Mr. Geoghegan.

J. C. Sarkies, Esq., proposed by Mr. Woodrow, seconded by Mr. H. F. Blanford.

D. R. Onslow, Esq., proposed by Mr. Sandeman, seconded by Mr. H. F. Blanford.

J. H. A. Branson, Esq., proposed by Mr. Heeley, seconded by Mr. Wheeler.

Whitley Stokes, Esq., proposed by Mr. H. B. Medlicott, seconded by Mr. Heeley.

R. J. Richardson, Esq., C. S., proposed by Mr. H. F. Blanford, seconded by Mr. Heeley.

E. S. Robertson, Esq., C. S., proposed by Mr. Heeley, seconded by Dr. Colles.

E. T. Atkinson, Esq., C. S., Jaunpore, proposed by Mr. Heeley, seconded by Mr. H. F. Blanford.

The Council reported that they had elected Colonel C. Douglas to the Meteorological and Library Committees.

Communications were received :—

1. From E. Thomas, Esq., A continuation of his paper on Ancient Indian Weights.

2. From Baboo Gopee Nath Sen, Abstract of the results of the Hourly Meteorological Observations, taken at the Surveyor General's Office in July and August 1864.

3. From the Secretary Antiquarian Association of the Central provinces :—

I. A Memorandum on some of the principal Hill Tribes of the Satpoora Range.

II. Notes on the Gurjat State of Patna, by Major H. B. Impey, Deputy Commissioner of Sumbulpore.

III. A letter from the Officiating Deputy Commissioner of Belaspore to the Commissioner of the Chuttesgurh Division, containing a History of the Hey Hey Bunsee Dynasty of Ruttenpore.

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4. From Captain H. H. Godwin-Austen, F. R. G. S., description of a mystery play as performed in Ladak, Zaskar, &c.

The Librarian submitted a report of the accessions to the Library since the meeting held in July last.

Captain Godwin-Austen's paper was read by the Secretary. He stated that mystery plays were enacted in the principal monasteries of Ladak, in the spring and autumn of each year. He saw the performance in the monastery of Hinnis, situated in a ravine opening on the Indus, a day's journey above Leh. Captain Austen describes the monastery and its furniture at some detail, and proceeds to analyse the performance, which commenced with a dance to music of masked figures, in an extraordinary costume, with the device of a skull upon the breast; each dancer also held a ladle, made of a human skull, with long streamers of silk attached to it. To this succeeded other dances, the masks being frequently changed; one set had the third eye in the centre of the forehead, which is the mark of a deity; others were jesters or harlequins; others represented the Court of Indra; and the scene closed with a "dance of death," the performers in which were got up to represent skeletons. Captain Austen's paper was illustrated by stereoscopic views of the various *tableaux*, taken by Captain A. B. Melville, and which had been previously exhibited to the Society, and was accompanied by a translation of a MS. obtained in Ladak, and furnishing directions to dancers.

Captain Lees said,—"I was asked a question at our last meeting by the Hon'ble George Campbell, whose attention had been attracted by the following passage in Purchas' travels in India during the reign of Akbar:—

"'In his Treasurie of Agra are in gold of Seraffins Ecberi (which are ten Rupias a piece) three score Leckes. Of another sort, which are one thousand Rupias each, twentie thousand pieces; and ten thousand of another sort, halfe the value. Of Toles (euery tole is a Rupia of siluer, and ten of those toles is the value of one of gold) thirtie thousand. Of another sort of ten toles, five and twentie thousand; of another sort of five toles, fiftie thousand.'

"The learned gentleman wished to know, with reference to the proposed introduction of a gold currency into India, whether the coin here alluded to under the name *Seraffin*, the value of which would

appear to have been Rs. 10-0-0, could have been the original of our English Sovereign. At the time, I stated that no value could be placed on any deductions made from foreign words occurring in the work alluded to, in consequence of the barbarous style of the Author's or Editor's Orthography; that I believed that by the word *Seraffin* the author meant Ashrafi; but as, notwithstanding the elaborate work of Abu'l Fazl, there was considerable doubt regarding some points connected with the currency of India in Akbar's time, I promised to make enquiry on the subject. Enquiry, however, has resulted in little more than a strong confirmation of the opinions I expressed in this room a few months back, regarding the very great danger of too general an application of the Roman alphabet to oriental languages. It would be impossible, I think, to find a better illustration of the mischief that might result, if the Romanizing principle were carried beyond its legitimate limits, than is contained in this work, one short passage of which I will read to the meeting.

"'*Garcias ab Horto* writes, that 'The Mogors had possessed the kingdome of Delly: but a certaine Bengalan (rebelling against his master) slue him, usurped his state, and by force of warre added this of Canara also to his dominion; he was called *Xabolam*. This king made his sister's sonne his successor, who was much addicted to Forreiners. He divided his kingdome into twelve parts, or Provinces, over which he set so many captains: Idalcam from Angidaua to Cifarda; from thence to Negatona, Nizamaluco; over Balaguate, or the up-hill country (for Bala in the Persian language signifieth, the toppe, and Guate a hill), Imadmaluco, and Catalmaluco, and Verido, &c. These all rebelled, and captured Daquem their King at Beder, the chief citie of Decan, and shared his Kingdome amongst themselves and some Gentiles, partners in the conspiracie. They were all forreiners but Nizamaluca. This and the other names before mentioned, were Titles of Honour, given them with their offices by the king, corrupted by the vulgar in pronouncing. Idalcam is *Adel-ham; Adel* in the Persian language, signifieth Justice; *Ham* is the Tartarian appellation, signifying a Prince, or King (which name might well be the reliques of the Tartarian conquests in those parts), so *Adel-ham* is *king of justice*. *Neza* in the Persian (which *Scaliger* saith is of like extent in the East, as Latine in the West) is a Lance; *Maluco* signi-

fieth the Kingdome. *Neza* or *Nizamaluco*, the speare or lance of the kingdome. So, *Cotamaluco*, the Tower of the kingdome. *Imadmaluco* the Throne of the kingdome, &c. *Nizamaluco* is also called *Nizamoxa*, which *xa* or *scha* is a Persian title (signifying as *Monsieur* in France, *Don* in Spaine), and given by *Ismael* the Sophi and *Tamas* his sonne to all those kings that would communicate in their sect, which *Nizamoxa* only yielded to. Other of them made shew, but soone recanted. Thus farre *Garcias*.'

"Now here we have an intelligent, and certainly an honest traveller, rendering his narrative, as far as the identification of proper names is concerned, not only almost wholly unintelligible, but leading himself into the commission of serious etymological blunders. By *Nizamaluco* no doubt is meant *Nizam al-Mulk*. This to the present day is a popular error for *Nazim al-Mulk*, a title meaning administrator, or a country governor of a kingdom, and frequently applied to the emperor's *Naibs* or Viceroys. The other titles I assume to be, *Adil Khan*, *Imad al-Mulk*, *Kutb al-Mulk*, *Nizam-Shah*. To the last mentioned, *Verido*, no oriental word that I am acquainted with will approximate. I fully concur in all that is said regarding the advantages that would result from reducing the number of alphabets in which we now find the languages of the world written; and if efforts are confined to unlettered languages, or those which have little or no original literature, probably no harm would result from making the attempt. If, again, the numerous alphabets of cognate languages could be reverted to the existing form of their original type, or that form of the same family of languages which had received the highest development, while in one sense it would be a retrogression, in another it would be an *immense* stride in advance. But if we were seeking for it, we could not, perhaps, find a more forcible illustration of the mischievous effects which I fear, as those who think with me fear, would follow the general adoption of a principle which, I cannot but think, when it came to be practically applied, would prove wholly impracticable.

"But to return to our *Seraffins*. I can find no such word in any oriental history, nor any nearer approach to it than that which, I before mentioned I believe it to represent—*viz.*, the *ashrafi*, which I may mention is itself etymologically a word of some obscurity. Abu'l Fazl has given very detailed information about the mints and coins of

Akbar. I am inclined to doubt if it can be entirely relied on. He gives a very long list of gold and silver coins as current. On four of these (the chozal, weighing 3 tolahs and 5½ ratis, Rs. 30; the *aftâbe*, 1 tolah 2 mashas 4¾ ratis, Rs. 12; the *Illahi*, 12 mashas 1⅓ ratis, Rs. 10; and the *Adl Gutkah*, 11 mashas, Rs. 9,)—Mr. Thomas has based some calculations. The rupee, Abu'l Fazl states, was first introduced by Shir Shah, and maintained in his currency by Akbar, who it is stated raised the standard, a statement which experiment will bear out. The currency of the Mohammadan Sovereigns of India, as a matter of antiquarian research, is of considerable interest to those who are studying this subject; but at the present time, when the question of a gold currency for India is being discussed, there is a point connected with it which, if this Society could throw any light on, would be of some practical importance. I allude to the value of silver expressed in gold, 250 years ago. Mr. Thomas, assuming the accuracy of Abu'l Fazl's statements, and on the basis of some calculations made by Colonel W. Anderson, has stated the relative values of gold and silver in Akbar's time to have been as 1 to 9·4. But I am unable to verify the data to be found in Abu'l Fazl, and here Purchas' statement, that an ashrafi, or *Seraffin* as he called it, was worth only Rs. 10, is of some value. I find no gold coin of Akbar's existing that will fit most of the coins described by Abu'l Fazl. Marsden figures 7 of Akbar's gold coins, five averaging 166½ grains, and two 188 grains. Prinsep gives three, one weighing 159, another 174, and the third 186 grains. Dr. Shekleton, the assay master of the Calcutta Mint, who takes much interest in enquiries of the kind, and who is at present engaged in the preparation of some tables in continuation and amplification of Prinsep's, which will be of much value, has very kindly given me the weight of some thirty Shir Shahi and Akbari rupees from the rapidly formed but large collection of Colonel Guthrie, who has promised a further supply of gold coins for the same purpose. In forwarding the *data*, Dr. Shekleton says:—'I agree with you that Abu'l Fazl's coins and their par of exchange are hardly reliable: 9-4 to 1 is a relative value of gold to silver which never could really have existed;' and he adds:—'None of the silver coins are pure *absolutely;* they are about 16 Br., or 98.333 per cent. of pure metal. This, however, is termed pure by the native refiners, as their process does not admit of

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a higher quality of refinage. 'Pure,' therefore, with reference to native coins, means that they contain no purposely added alloy.

'The average weight of all the Akbars is grs. 168.432.

'The value of 10 in Indian Rupees (present currency) is Rupees 10-0-7 at 16 Br.

'The average weight of the Shir Shah Rupees is grs. 167-13-3.

'Value of 10, in Indian Rupees, is Rupees 9-15-7, at 16 Br., showing that 10 Rupees of either Akbar or Shir Shah's coinage are about equal in value to 10 Rupees, present currency.'

"From the earliest times the current coins of all Mohammedan sovereigns have been the *dinár*, or gold denarius; the *dirhem*, or silver drachma; and the copper *fals*, or, as it is more generally used in the plural, *falus*. The word *dinár*, is a word of considerable historical importance, as it has given rise to certain chronological speculations by no means of small interest. It is used in an inscription of Chandra Gupta's date, as if the coin were then current; but it occurs very much earlier in Hindoo shasters prior to the time of Panini, who it is supposed lived in the fourth century B. C. It is mentioned, however, in early Sanskrit literature as an ornament only, and would appear to have been worn round the neck, several being strung together, separated by coral or other beads, in a manner similar to the necklaces of gold mohurs we see every day worn by the natives around us. The ancient Sanskrit Grammarians endeavoured to derive the word from Sanskrit roots; but there is no doubt that it is the Roman *denarius*, although that coin was of silver. The *dirhem* is the Greek *drachma*. Our cabinets of Bactrian coins furnish us with numerous specimens of drachmas, didrachmas, and tetradrachmas.

"The *falus* is the obolus. Akbar adopted the rupee of Shir Shah, and, if we are to put faith in Abu'l Fazl, paid great attention to the standard of his coins. Still, all the silver coins of his mints I have had tested differ somewhat in weight, some as much as 10 grains. The average of eleven, however, gives a coin as nearly as possible equal in weight to the Company's Rupee. The basis of his currency was the *dam*. Abu'l Fazl says that one of Akbar's rupees exchanged for forty of these dams, and this statement has helped Mr. Thomas; but I think some further investigation with the help of the coins themselves is desirable, before we accept so very low a value for gold in the reign of Akbar."

Mr. Blanford asked Captain Lees if he could inform the meeting of the origin of the application of the term *sovereign* to the coin.

Captain Lees replied that he had no doubt that the origin of the application of *sovereign* in England to gold coins of the realm was similar to that of the *Napoleon* and *louis d'or* to gold coins in France, and *Frederic d'or* to gold coins in Prussia. As to the word itself, its English orthography is so barbarous as to conceal its origin. The correct word is *suveran*, French *souverain*, for the Latin *supernus*, or, more nearly, the Italian *sovrano;* and it is a very singular coincidence, (but I may add that I attach to it only the singularity of a coincidence,) that in ancient Hindu literature gold and gold coin is most usually mentioned under this very term *suverna*; or if we drop the inherent final vowel, as is usual in the vernaculars, we shall have precisely the word the origin of which we are in search of, *suvern*.

Library.

The following additions have been made to the Library since the meeting held in July last.

Presentations.

*** *The names of donors in capitals.*

Verhandlungen des Zoologisch-botanischen Vereins in Wien, Jahr 1855—62, Vols. V. to XII.—The Zoologico-Botanic Society of Vienna.

Bericht über die Oesterreichische Literatur der Zoologie, Botanik und Palaeontologie, aus den Jahren 1850, 1851, 1852, 1853.—The Same.

Personen- Orts- und Sach Register der Wiener K. K. Zoologisch-botanischen Gesellschaft, 1851—55 and 1856—1860.—The Same.

Nachträge zu Maly's Enumeratio plantarum phanerogamicarum Imperii Austriaci Universi, von A. Neilreich.—The Same.

Separat-abdruck naturwissenschaftlicher Abhandlungen aus den Schriften des Zoologisch-botanischen Vereins in Wien.—The Same.

Festkranz zur zweiten Jahresfeier des Zoologisch-botanischen Vereins.—The Same.

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Methematisch—Naturwissenschaftliche Classe, Band XLVI. abth. I.

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Nos. 6 to 10; Band XLVII, abth. I, Nos. 1 to 3; Band XLVI, abth. II, Nos. 8 to 10—Band XLVII, abth. II, Nos. 1 to 4;—Philosophisch-Historische classe—Band XL, Heft 3, 4 and 5; Band XLI, Heft 1 und 2.—THE IMPERIAL ACADEMY.

Register zu den Bänden 31 bis 40 der Sitzungsberichte der Philos-Historischen classe der K. Akademie der Wissenschaften, Vol. IV.—THE SAME.

Archiv für Kunde Oesterreichischer Geschichts-Quellen; Band XXVIII, Zweite Hälfte, und Band XXIX. Erste und Zweite hälfte.—THE SAME.

Fontes Rerum Austriacarum, Oesterreichische Geschichts-Quellen, Band V, abth. I; Band XXII, abth. II.—THE SAME.

Denkschriften der K. Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche classe, Band. XXI.—THE SAME.

Physicalische Verhältnisse und Vertheilung der Organismen im Quarnerischen Golfe, von Dr. J. R. Lorenz.—THE SAME.

Mémoires de L'Académie Impériale des Sciences, Belles-Lettres et Arts, de Lyon—Classe des Lettres, Tomes IX. and X.—Classe des Sciences, Tomes X. XI. and XII.—THE ACADEMY.

Annales des Sciences Physiques et d'Industrie, de Lyon, Vols. II. to VI. 3rd Series.—THE SAME.

Abhandlungen der Akad. d. Wissenschaften zu Berlin, aus dem Jahre 1862.—THE PRUSSIAN ACADEMY.

Monatsberichte der K. Preuss. Akademie der Wissenschaften zu Berlin, aus dem Jahre 1863.—THE SAME.

Memorie della Reale Accademia delle Scienze di Torino, Serie Seconda, Tomo XX. 1863.—THE ROYAL ACADEMY OF SCIENCE OF TURIN.

Proceedings of the Royal Society of Edinburgh, Session 1862-63, Vol. 5 No. 59.—THE SOCIETY.

Abhandlungen der Mathemat.-Physikalischen classe der königlich Bayerischen Akademie der Wissenschaften. Neunten Bandes, dritte abtheilung.—THE ROYAL BAVARIAN ACADEMY.

Sitzungsberichte der Königl. bayer. Akademie der Wissenschaften zu München; 1862, Band II, Heft 2—4; 1863, Band I, Heft 1 and 2.—THE SAME.

Denkrede auf Joh. Andreas Wagner, von Dr. Carl Friedrich Philipp von Martius.—THE SAME.

Ueber die Deutschen Einheitsbestrebungen im 16 Jahrhundert, von dem Konigl. Universitäts-Professor Dr. Cornelius.—THE SAME.

Rede in der öffentlichen Sitzung der K. Akademie der Wissenschaften am 28 März 1863, von Justus Freiherrn von Liebig.—THE SAME.

Ueber die Stellung und Bedentung der pathologischen Anatomie, von Dr. L. Buhl, München, 1863.—THE SAME.

Zapiski Imperatorskago Russkago Geographikeskago Obstestva, 1862, knizka, I., II., and IV. and 1863, knizka I. and II.—THE IMPERIAL ACADEMY OF ST. PETERSBURGH.

Otketŏ Imperatorskoi Publiknoi Biblioteki za 1860 Godô to 1862 Godô.—THE SAME.

Geographikesko—Statistikeskii Slovare Rossiiskoi Imperii, Tomŏ I. —THE SAME.

Catalogue des Manuscrits et Xylographes Orientaux de la Bibliothèque Impériale Publique de St. Petersbourg, 1852.—THE SAME.

Ein Beitrag zur Deutschen Literatur aus Russland, der Universität Jena ; Lavater's Briefe an die Kaiserin Maria Feodorowna.—THE SAME.

Guide de la Bibliothèque Impériale Publique de St. Pétersbourg, 1860.—THE SAME.

Wegweiser der Kaiserlich Oeffentlichen Bibliothek zu St. Petersburg.—THE SAME.

Réglement pour les visiteurs de la Bibliothèque Impériale Publique de St. Pétersbourg, 1852.—THE SAME.

Les Elzevir de la Bibliothèque Impériale Publique de St. Petersbourg, 1862.—THE SAME.

Catalogue des publications de la Bibliothèque Impériale Publique de St. Petersbourg.—THE SAME.

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LALGOPAL DUTT.

2nd November, 1864.

FOR DECEMBER, 1864.

The monthly General Meeting of the Asiatic Society of Bengal was held on the 7th instant.

Colonel R. Strachey, senior member present, in the chair.

The minutes of the last Meeting were read and confirmed.

Mr. Oldham desired to correct a misapprehension which had taken place in the report of what he had said at the Meeting in December last. He said that Dr. Gerard had sent a collection to Mr. Buckland and the Asiatic Society had sent one also, and that Dr. Gerard's was the first;—not that Dr. Gerard's collection reached home before the collection sent from Calcutta. Professor Phillips with characteristic caution had left the matter where he found it.

Mr. Blanford reminded the Meeting that, on the occasion referred to, he had reduced the argument of the validity of the Oxford fossils as affording evidence of the authenticity of the disputed specimens in the Society's Museum to one crucial question, viz., "Could it be proved by a comparison of dates, that Dr. Buckland's fossils reached England before the Society's collection reached Calcutta?" To this question he, and he believed others at the Meeting, had understood Mr. Oldham to reply that he had not his notes with him at the time, but he knew that he had notes of the dates required, and that they shewed that Dr. Gerard's fossils could not have been sent from the Society's Museum. Mr. Blanford still thought that it would aid the settlement of this question if Mr. Oldham would place his notes upon record in the Society's proceedings.

Mr. Oldham replied that he had some notes, but he declined to produce them.

Mr. Blanford remarked that in that case the whole matter remained

exactly where it was before Mr. Oldham made his attack upon his (Mr. Blanford's) paper on the Spiti Fossils.

Dr. Stoliczka mentioned that Mr. Schlagintweit has described from Gnari-Khorsum an Ammonite, viz., *Ammonites Kobelli*, which is very analogous to *A. bifrons*, so much so, that the one might be taken for the other; that both the species or varieties, as they may be called, exist in the Society's collection; and that it would be desirable to know whether the same are represented in the Oxford collections.

Mr. Blanford remarked that, though the species might be similar, the peculiarity of the supposed Gerard Fossils was in the absolute identity of their mineral character with that of the Whitby fossils; moreover, the abundance of the same species at Spiti and Whitby, and the absence at Spiti of other fossils having the same mineral character, but not specifically identical with Whitby fossils.

Colonel Strachey made some remarks tending to throw doubt on the authenticity of the disputed Gerard fossils.

The following presentations were announced:—

1. From W. Cornish, Esq. a specimen of the Black-backed Goose *(Sarkidiornis melanonotus.)*

2. From Lieutenant R. C. Beavan; two specimens of *Dendrocitta rufa.*

3. From Dr. F. Stoliczka; a specimen of *Lagomys Curzoniæ.*

4. From Baboo Rajendra Mullick; two specimens of *Goura Coronata*, or crowned Pigeon; five specimens of Wild Ducks, a Flamingo, and a black Lemur.

5. From A. C. L. Carlyle, Esq., Officiating Curator; three specimens of Bats: one *Nycticejus canus*, and two of a species of *Scotophilus*, Calcutta.

6. From Baboo Poorno Chunder Bysack, Assistant Curator; several specimens of young Rats.

7. From Lieutenant R. C. Beavan; three books, viz., "England's Workshops;" "The Utilization of Minute Life," and another work.

8. From the Government of India, Foreign Department; two copies of a series of Photographic likenesses of the tribes of Nepal, taken by Captain Taylor.

The Officiating Curator exhibited the skeletons of a large Crocodile and a Frog, *Rana Brahma*, prepared for the Museum.

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A letter from Major A. B. Johnson, intimating his desire to withdraw from the Society, was recorded.

The Secretary read the following copy of a letter from the Secretary of State for India, sanctioning the transfer to Government of the Museum of the Asiatic Society of Bengal; forwarded by the Under-Secretary to the Government of India, Home Department:—

"India Office, London, 15th October 1864. Public.

No. 79.

"His Excellency the Right Hon'ble the Governor General of India in Council.

"Sir,—I have received and considered in Council your letter dated 27th June (No. 35) 1864; and I have in reply to communicate my sanction to the proposals therein submitted for the transfer to Government of the Museum of the Asiatic Society of Bengal, and for the formation of an Imperial Museum at Calcutta.

"2. I shall take immediate steps in accordance with your request for the selection of a competent Curator for the Museum, on the terms proposed by you, together with the allowance of one hundred and fifty pounds (£150) as passage and outfit money.

I have, &c.,

(Sd.) C. Wood."

No. 5870.

"Copy forwarded to the Secretary to the Asiatic Society, Calcutta, with reference to correspondence ending with his letter No. 177, dated 5th April 1864.

"By order,

(Sd.) "A. Colvin,

"*Officiating Under-Secy. to the Govt. of India.*"

The Council reported that, having received a letter from the officiating Curator requesting that his resignation, as announced to the last Meeting of the Society, might be withdrawn, they had allowed Mr. Carlyle to defer his resignation to the end of the current month (December), about or shortly after which time the Curator appointed by the Secretary of State may be expected to arrive.

The following gentlemen, duly proposed at the previous Meeting, were balloted for as Ordinary Members:—

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W. Anderson, Esq.
H. Dunlop, Esq.
J. C. Sarkies, Esq.
D. R. Onslow, Esq.
J. H. A. Branson, Esq.
Whitley Stokes, Esq.
R. J. Richardson, Esq.
E. S. Robertson, Esq.
E. T. Atkinson, Esq.

The following gentlemen were named for ballot as Ordinary Members at the ensuing Meeting.

Lieutenant J. H. Urquhart, R. E., proposed by Captain Godwin Austen, seconded by H. F. Blanford, Esq.

Dr. J. Anderson, proposed by Dr. Partridge, seconded by W. L. Heeley, Esq.

The receipt of the following Communications was announced :—

1. From Baboo Gopee Nauth Sen; an abstract of the Hourly Meteorological Observations taken at the Surveyor General's Office in September last.

2. From Dr. Stoliczka; a note on *Lagomys Curzoniæ* Hodgson.

The Secretary read Dr. Stoliczka's paper, of which the following is an abstract :—During a late visit to Eastern Ladak, Dr. Stoliczka had succeeded in procuring several specimens of this animal, one of which had been prepared for the Society's Museum, and was exhibited on the table of the meeting room. Although occurring plentifully in Ladak, this was the first specimen that had reached the Society's Museum. After a detailed description of specimens of different age, &c., and noting the differences which characterized young and adult specimens, Dr. Stoliczka gives an account of the habitat of the species. It does not live usually at a less elevation than 15,500 ft. above the sea. Round the Chomoriri lake it is associated with *Phaiomys lucurus* and *Arctomys bobac*. The greatest elevation at which Dr. Stoliczka met with it was 18,672 ft., at the top of the Ladak pass, on the confines of vegetation. Between 15,500 ft. and at the latter elevation, it is very abundant throughout Ladak, and it appears to range far to the Eastward, as Mr. Hodgson obtained specimens from Chumbi, N. W. of Sikhim. Dr. Stoliczka had not observed it south of the Bara Lacha range. In Spiti *L. Curzoniæ* is represented by another species, *L. Roylei*, which ranges between 12,500 and 16,000 ft.

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On the motion of the Chairman, the thanks of the meeting were voted to Dr. Stoliczka.

The Secretary read the following report of the Meteorological Committee of the Society, prefaced by an Introductory Memorandum; also a letter from the Government of India, Military Department, and the resolution of the Council thereupon.

INTRODUCTORY MEMORANDUM.

The Meteorological Committee of the Society, as it at present exists, was formed on the proposition of Colonel Strachey in April 1857, apparently in the expectation that, as a deliberative body, it would superintend the Collection of Meteorological observations, acting, to quote the words of the original Memorandum, "as a controlling power capable of combining the work of all observers."

There are no records of any work having been done by the Committee up to February 1861, when the offer of some self-registering instruments to the Society gave rise to a discussion, which resulted in the resolution, "That it is not desirable for the Society itself to attempt to make Meteorological observations, but that the Council should be recommended to address Government generally, on the importance of establishing a uniform system of Meteorological Observation throughout India, so managed as to admit of proper comparison; and on the means which should be adopted to bring about improvements in existing registers; and generally to further the accurate investigation of Meteorological phenomena." At a subsequent meeting of the Committee in April 1862, Colonel Strachey submitted the draft of a Report in accordance with the above Resolution, and this with slight alterations was sent up to the Council, and laid before the Meeting of the Society in May 1862.

In this report, after pointing out the great importance of a knowledge of Meteorological laws, and the direct influence of Meteorological Phenomena on life, health, and property, and adducing the drought and consequent famine of the previous year, as a prominent instance in support of their view, it was shewn that the present system of Meteorological Observation and record is totally inadequate to afford the data requisite for the elucidation of the laws of the climate, or for enabling us to avail ourselves of them even were they known; that while many of the records, now kept, are made with no sufficient

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attention, and are not susceptible of comparison one with the other, from the very different ways in which they are kept, the value of the whole is very much diminished if not altogether lost, owing to the impossibility of distinguishing the good from the bad. It was further observed that the very essence of the value of such observations is, that they should be brought in relation one with the other, and that this must be done in a regular, systematic, and scientific manner. It was therefore suggested that a Board of the leading scientific men in India should be appointed by Government to make suggestions on this and kindred subjects; and it was conceived that the suggestions of a Board so constituted would be received with thankfulness by Government and all individual observers, and that such recommendations would practically carry with them sufficient weight, to give that spirit and unity of method to all meteorological observation which is so entirely wanting at present, and which is so essential to any real progress in the science and its practical application. The Council, in presenting this report, requested the authority of the Society to address Government in accordance therewith; which authority, after an interesting and animated discussion, was formally accorded.

A letter, dated 20th June 1862, was therefore addressed to Government, recommending that a Meteorological Committee should be constituted by Government, on the plan of the Meteorological Committee of the Board of Trade in London, for the advancement of Meteorological Science. In this letter the special importance of Meteorological information in this country was strongly insisted on. "The terrific hurricanes that from time to time have swept over the Sea of Bengal, causing the most calamitous destruction of property in shipping, and carrying death almost to the entire population of whole districts that have been submerged by the storm-wave," were quoted as well-known facts; and it was predicted (a prediction the disastrous fulfilment of which is fresh in the recollection of us all), that such storms would surely be repeated in the future. The horrors of the famine of the previous year, and the importance of any knowledge that would enable us to foresee those terrible calamities, were appealed to as strong arguments for systematic reform of the existing inefficient machinery, and as an instance of the interest which the Government has in the effects of Meteorological phenomena. Other arrangements of a simila

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character, and tending to the same end, were also adduced; and finally the Council stated that they would be prepared to submit a definite plan without loss of time, should the general views they had expressed be approved by His Excellency the Governor General in Council.

The reply of Government to this letter was received in February 1863. The Government intimated that it fully recognized the value of Meteorological observations properly conducted and collated by persons really competent to the task, and that it would afford all reasonable assistance, if a scheme can be devised likely to effect the object desired by the Asiatic Society. Further, the Government would be glad to receive and take into consideration the definite proposals of the Society, concluding that the nature of the observations, and the forms of recording them, will be proposed by the Society with a due regard to the circumstances under which, and the persons by whom, they may have in many cases to be conducted, and also to the great importance of ensuring as far as possible that they *may be relied on as accurate.*

This letter being referred to the Meteorological Committee, the preparation of a draft Report was entrusted to Colonel Strachey, on his intimation that he had a detailed scheme of operations which he wished to recommend to the Society.

Colonel Strachey's draft was received in April 1864, but in the interim, *viz.*, in November 1863, a *memo.* was received from the Military Department, intimating that the Government would be glad to be favoured with an early reply to the previous letter.

On the receipt of Colonel Strachey's draft it was at once circulated to the Committee, and a number of alterations were suggested, which, retaining the fundamental propositions of Colonel Strachey's draft, were embodied in a second draft, for circulation to the absent members of the Committee, and others, not members of the Committee, but whose suggestions might, it was thought, be useful to the end in view. It was desired to obtain the fullest expression of opinion on the part of those, who, from their scientific acquirements or their special interest in Meteorology, might be in a position to give important aid to the Committee; and the Draft, as agreed upon by the resident members of the Committee, was therefore printed with half margin, and circulated as already mentioned. To these circulars a

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number of answers and comments were received, the majority being in full accordance with the terms of the report. These were circulated to the resident members of the Committee, and a meeting was then held, (on the 22nd August,) at which the whole Report was reconsidered, and some slight alterations agreed upon. The Report thus completed was sent up to the Council, and recorded at the meeting held on the 2nd September; but as it was thought desirable that a subject of so much importance should receive the leisurely consideration of the Council, it was ordered to be circulated to the Council, and to be reconsidered at the following meeting. The chief alteration suggested by the Council was, that that part of the Draft which provided for a Board of Meteorology should be struck out, on the ground that the essential requirements of the system were efficient administration, and that it would be undesirable to divide the responsibility between an executive Secretary and a deliberative Board. The report was therefore referred back to the Committee, recirculated and considered at two meetings, and in its final revised form is now submitted by the Council at this meeting of the Society.

At the time when these lengthened deliberations were approaching completion, *viz.*, on the 19th October, a letter was received from the Military Department, informing the Society, that "in consequence of a further communication from the Right Hon'ble the Secretary of State, transmitting some suggestions of the War Department, the Governor-General in Council has decided to entrust the consideration of the question to the Sanitary Commission, and does not therefore consider it necessary to trouble the Society any further in the matter. His Excellency desired, however, to convey the acknowledgments of Government to the Asiatic Society for their original offer, and for the trouble they are believed to have taken preparatory to carrying it out." On receipt of this letter, it was decided that the Report be completed as originally intended, and that its submission to the Society be deferred for a month, in order that, should any further information be received respecting this most unexpected communication, it might be submitted to the meeting, together with the Report and the Government letter.

No further communication has been received, and the Report is therefore now submitted to the Society, together with all correspondence relating thereto.

The following letter was then read:—

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No. 280.

MILITARY DEPARTMENT.

To the Secretary to the Asiatic Society.

SIR,—With reference to the office Memo. from this Dept. No. 226, dated 11th November 1863, requesting an early reply to a previous communication relative to the offer of the Asiatic Society to submit a scheme for systematically conducting and recording Meteorological Observations in India, I am directed to acquaint you that, in consequence of a further communication from the Right Hon'ble the Secretary of State, transmitting some suggestions of the War Department, the Right Hon'ble the Governor General in Council has decided to entrust the consideration of the question to the Sanitary Commission, and does not therefore consider it necessary to trouble the Society any further in the matter.

His Excellency in Council, however, desires me to convey the acknowledgments of Government to the Asiatic Society for their original offer, and for the trouble they are believed to have taken preparatory to carrying it out.

I am, &c.,

(Sd.) H. K. BURNE, *Captain*,

Offg. Secy. to the Govt. of India.

REPORT OF THE METEOROLOGICAL COMMITTEE.

In reporting upon the measures which, in the opinion of the Meteorological Committee, are essential to a sound and useful system of Meteorological registration, it must be premised that in Meteorology, as in all branches of physical science, accuracy of observation, and a clearly defined and rational aim, are indispensable to utility; and that, however desirable it may be that observations should be numerous, it is far better to limit them to any degree, than, by attempting to ensure fulness, to risk the accuracy and trust-worthiness of the record. Labour and money are equally thrown away upon any scheme which does not fulfil these all-important conditions.

That this proposition is true, when the object is purely to ascertain abstract laws, needs no argument; that it is equally true when the observations are made partly or chiefly with an economic or social object, is no less certain, though it may not at first sight be equally

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apparent. The value of lunar tables to the seaman, that of a geological map to the miner, or of a chemical analysis to the manufacturer, depends upon their respective trustworthiness. If they cannot be trusted they are worthless; and the data, which it is the object of Meteorology to supply, in no way differ in this respect from those furnished by the Astronomer, the Geologist, or the Chemist. Among the more important indications of Meteorological data are the amount of rainfall, and the variation which this undergoes as cultivation increases or as forests are cleared; the causes of local and epidemic disease, which, although much wrapped in obscurity, may not improbably be in part dependent on the dampness of the atmosphere, the absence of ozone, the prevalence of particular winds, &c.; and the prognostication of storms, or of seasons of drought or unusual rainfall. Such phenomena are indeed only in a few cases capable of control, but it is only necessary to point to the results attained by Admiral Fitzroy, to prove that, when forewarned, we may be able in a great number of cases either to avoid or diminish their more disastrous effects. But in order that any of the laws of these phenomena may be determined, so that they may be acted upon with confidence, it is essential that the observations from which they are deduced be reliable and accurate. The observations of many successive years must, in most cases, be recorded, in order that the laws of recurring atmospheric changes, and the effects of those changes on agriculture, health, &c., may be ascertained, and the observations taken at different times and places must be capable of strict comparison. It is clear that no loose system of record will admit of this; and indeed the very knowledge that a series of observations had been made by an incompetent observer, or with instruments not strictly trustworthy, would at once be sufficient to warrant their rejection, when, as in Meteorology, the increments of variation are so small, that the error of observation will in many cases conceal or neutralize, if it does not absolutely invert, their true law of succession. Even if, at one and the same station, the conditions of error are so constant that a result true in the main is obtained, when the observation of different periods are compared, this will be the utmost attainable; and the observations are neither comparable with those taken under different conditions elsewhere, nor can they in any case be accepted with that confidence which alone will give them value,

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when their indications are to be taken as the basis of active measures involving great interests. In truth, it may be stated as an invariable axiom, that scientific data which cannot be confidently accepted as trustworthy, are equally worthless to science and economics.

Strongly holding this view, the Meteorological Committee cannot recommend the adoption of any scheme which does not provide competent means of observation, and skilled and intelligent, in other words, special scientific supervision. They consider that in establishing a system of Meteorological registration for India, it may be wise not to aim at much detail, or at very extensive results at the outset, but it will be better to devote whatever sums the Government may grant for Meteorology, to provide a small but efficient staff, which may be extended in such manner and direction as experience may hereafter show to be advisable. It should be the duty of this staff, in the first place, to review the existing machinery of observation; to select and improve such parts as may be found capable of yielding useful results; and the rest should be strictly excluded from the Government official record as being only calculated to vitiate the general results if mixed up with more accurate data. When, by selection and careful supervision, a reliable system of record shall have been established, a Central Office will be necessary, at which the general results, furnished by the Local Officers of the staff, may be worked up into such a form as to render them available to Government and Foreign Meteorological bodies; and in the interim the whole system should be under the control of a skilled and trustworthy officer.

The general scheme which the Committee would therefore recommend, consists of the following parts:—

1*st*.—A Superintendent.

2*nd*.—Local Reporters, one to each of the seven Governments of India.

3*rd*.—Local observers, to be selected from those now existing, and others, who should be furnished with compared instruments and instructions to ensure uniformity of results.

The appointment, duties, and emoluments of each of these may be treated somewhat more in detail.

The Superintendent would be the sole responsible officer, to whose intelligence and scientific knowledge the formation and administration

of the entire system would be entrusted, and would be the immediate superior of the local Reporters. His duties would be to issue instructions as to the local Officers, to superintend the comparison and distribution of instruments, and their repair when necessary. He would carry on all correspondence with the Government and local Officers, and would receive all local reports, from which he would undertake the preparation of maps and such general reductions of the results of the department as would bring them into a form readily available to Government and the public, for general application. He would also place himself in communication with the Meteorological Departments of England and other countries, with a view to the exchange of Meteorological data, and in order that European Science might avail itself of the undoubtedly valuable additions which systematic observations in an inter-tropical country, possessing features so marked and varied as those of India, cannot fail to afford. These duties would demand much scientific knowledge and administrative capacity; and indeed the success of the system must, in a great measure, depend on the efficiency of this Officer. It would probably not be practicable to obtain a person qualified for the post at any salary below 1,000 Rupees per mensem, with travelling expenses and office allowance superadded. The appointment of some such officer is, it is considered, an essential part of any useful scheme of Meteorological registration, and the greatest care should be exercised in the selection of a person for the post.

The local Reporters, of whom one to each Government would probably prove sufficient at the outset, need not, it is considered, be Officers appointed exclusively to Meteorological work. It would be highly desirable that they should possess something beyond a mere empirical knowledge of Meteorology, and should be at least well acquainted with those portions of physics and physical geography which most closely relate to Meteorological phenomena; and to secure such qualifications, either a high salary must be offered, or a more moderate salary as an addition to that drawn for some other appointment. The latter course would probably be preferred; the more readily, as a larger field of selection would in this way be secured. It is considered desirable that persons habitually devoted to the pursuit of abstract knowledge, such as, for instance, some of the Professors of the Government or other Colleges, should, as a rule, be preferred for these appointments.

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The local Reporters should be carefully selected, and such a salary should be offered as would make it worth their while to devote time and care to the duties. If a very small remuneration be offered, it is scarcely probable that time and attention of more than equivalent value will be given; for Meteorological work, involving much tedious detail, does not present the same attractions to speculative minds, as are possessed by sciences of more immediate generalization. It is considered that Rs. 400 per mensem for pay and travelling expenses, and Rs. 100 for office, would be a just and moderate remuneration for the local Reporters. An annual report on the reduced and generalized results should be a *sine qua non*.

The local Reporters would, in the first place, be entrusted with the collection of all observations actually made by different Officers of Government; and from the whole would select such as, with improved appliances and systematisation, may be brought to that standard of accuracy which has been pointed out as a primary condition of value.

They would then see that the selected observers be furnished with properly compared instruments, and with instructions to enable them to conform to the general system adopted; and they would occasionally visit the observing stations, to ensure that the instructions issued are strictly observed.

They would also receive the tabulated results, and either reduce them to the standards of comparison, or, if too numerous to deal with themselves, forward them to the Central Office for that purpose; in the former case, they would send to the Central Reporter, copies of the reduced observations, together with the annual report on the general results, for the area of observation.

The observations now recorded under orders of Government may be classed under four heads, *viz.* :—those made at—

1*st*.—The Government Observatories at the Presidency stations. These are generally trustworthy, and made with standard instruments. It is proposed that the Central Observatories be placed under the superintendence of the local Reporters, and that special attention be directed to them in order that the observations there made may be used as standards of comparison. In certain cases, also, extension may be advantageously given to the observations, so that at all central stations the following classes of phenomena be recorded, by self-registering instruments wherever possible :—

Temperature of air and solar rays.
Atmospheric moisture.
Rain-fall.
Strength and direction of wind.
Clouds.
Atmospheric pressure.
Electrical condition of lower atmosphere.
Ozone.
Magnetic dip, variation and intensity.

2*nd*.—The observations made at the Government Hospitals. These are, it is believed, rarely trustworthy, and it would probably be found desirable to restrict the records to the larger stations; and unless special observers are appointed, to limit the observations to those at the known hours of maximum and minimum, restricting the instruments to the thermometer (dry bulb), barometer and rain-gauge. By thus limiting the number and kinds of observations, it would probably be found practicable to give them a value, which for the most part they cannot be considered to have at present.

3*rd*.—The observations recorded at Civil Stations, Prisons, and Police Stations. The majority of these are believed to have but little value, and the observers are rarely of sufficient education or intelligence to be entrusted with a register, in which accuracy cannot be ensured without constant intelligent supervision. There may be particular cases in which an educated Officer might take such interest in the subject of Meteorology that he would volunteer the superintendence of the observations. In this case, the offer might be accepted at the discretion of the local Reporter, and the requisite instruments furnished by Government. All such observers should be volunteers; it being unquestionable, that it is impolitic and disadvantageous to impose the duties of registration on those who take no personal interest in the work. At the discretion of the local Reporters, and with the approval of the Superintendent, a certain small allowance for writers should be made to observers of this class. Elsewhere, but little would probably be lost by the abandonment of this class of registers; if retained, they should be made for local record only, and should not be allowed to appear side by side with those of more value, upon which, such an association would only tend to throw discredit.

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4*th*.—On Government ships. These are fairly trustworthy, and, with a little care and attention on the part of the Reporter, may probably be made more so. The barometrical observations so made are especially of value, and those on the direction of the wind; every encouragement should be given to the multiplication of this class of observations on the larger merchant ships and private steamers.

A fifth class of observations may be recorded with advantage when obtainable, *viz*., those made by educated Planters, Engineers, and others scattered through the country, not in Government service. Though these may be few in number, in certain cases they will be of a value fully equal to those made at the Central Observatories. The Society now receives a series of observations of this character from a gentleman in Ceylon, which, for accuracy, care and fulness, are surpassed by none in the country. Should any registers of this class be obtainable, it would clearly be advisable to afford the observers furnishing them every aid in the loan or repair of instruments, the supply of forms of registers, &c.

The scheme thus submitted would involve an immediate maximum annual cost of about Rs. 67,000, including cost of instruments, office, travelling expenses for the Superintendent, &c., which may be divided as follows:—

	Monthly.
Secretary and Superintendent,.....	1,000
7 Local Reporters, at Rs. 500, ...	3,500
Central Office, Computers, &c., say	300
	4,800
Per annum	57,600
Instruments, Printing, &c., say	10,000
Total, per annum	67,600

The Committee believe that this scheme, without being very costly, would yield results which would amply compensate the expense. They would strongly urge as a general principle that any attempt to obtain Meteorological data on a cheap scale of payments will fail, as previous attempts have failed, and they believe that any expenditure

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which is so incurred will prove a loss of money, entailing only disappointment on all who look to the registration of Indian Meteorology to give information of value in sanitation, agriculture, and the general administration of the country.

On the proposition of the Chairman, it was resolved that, seeing the small number of members present at the meeting, the discussion of the Meteorological report should be deferred till the next meeting.

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INDEX I.

NATURAL SCIENCE.

	Page
Aitchison, J. E. T., on the Vegetation of the Jhelum district,...	290
Alum manufacture in Rajpootana, ...	525
Andaman Islanders, intercourse with, ...	31
——————— Introduced at Society's meeting, ...	62
——— Islands, Latitude and Longitude of, ...	396
Andamanese, memorandum on three, ...	162
Andamanese Pulmonifera, new species described, ...	245
Andamanese Vocabulary, ...	170
Authenticity of Liassic *Ammonites* from Spiti, ... 235,	576
Belote Range, geology of, ...	380
Blanford, H. F., on a fossil amphibian from Central India,336, ...	444
———————, Note on a Hail-storm, ...	530
——————— Tank Section at Sealdah, ...	154
——————— Remarks on species, ...	340
——————— Spiti Fossils, ... 576,	597
Bombay (South), Meridional Series, G. T. S., ...	391
Brooke, Col. J. C. on the mines of Khetree, ...	519
Bukrala Hill range vegetation, ...	305
Bunnoo, Geology of, ...	378
Burmese Pulmonifera, new species described, ...	243
Calcutta (East), Longitudinal Series, G. T. S., ...	388
Carboniferous fossils from Belote range, ...	380
Commerce of Burmah with Western China, ...	422
Copper mines of Khetree, ...	520
Ditto Smelting at ditto, ...	522
Correspondence on Meteorology, ...	605
Costello, Dr. C. P., on the Geology of Bunnoo and Shaikh Boodeen,	378
Delta, Gangetic, depression of, ...	158
Diduncculus Strigirostris, note on, ...	373
East Calcutta Longitudinal Series, G. T. S., ...	388
Fisheries of Pegu, ... 39,	195
Fossil amphibian from Central India, ...216, 336, 442,	461
Fossils of Bunnoo and Shaikh Boodeen, ...	379
——— Sealdah, 155; Khulna, 158; Spiti, ... 67, 232, 576,	597
Gangetic delta, depression of, ...	158
Geckos, notes on Burmese and Andaman species of, ...	535
Gibbon of Tenasserim, ...	196
Great Trigonometrical Survey, ...	381
Gurhagurh Meridional Series, G. T. S., ...	390
Hailstorm of 24th March, ...	530

Page

Hail Stones, structure of, ... 531
Helicidæ, Variation of, ... 238
Hislop, S., on fossil Amphibian from Central India, ... 443
Hot Springs of India and High Asia, ... 49
Human skull, Semi-fossil, ... 575
Hylobates hoolock, ... 197, 198
Hylobates lar, ... 196
Indian and Burmese *Helicidæ*, ... 238
India and High Asia; Hot Springs of, ... 49
Irawaddy below Bamo described, ... 416
Jaquemont's collection of Spiti fossils, ... 234
Jelallpore Tract, vegetation of, ... 309
Jhelum district, vegetation of, ... 290
——— tract, geology of, ... 291
——————— vegetation of, ... 292
Kashmir G. T. Survey, ... 385
Kedgeree, mean sea level of, ... 394, 395
Kharian hill range, vegetation of, ... 305
Khetree, copper and alum mines of, ... 519
Khulna Peat bed and buried trees, ... 158
Lagomys Curzoniæ, Hodgson, ... 600
Lake of clear water, ... 39 seq.
Levelling operations, G. T. S., ... 392
Liassic *ammonites* from Spiti, ... 235, 576
Low hill ranges of Jhelum district, vegetation of, ... 305
Madras, stone implements from, ... 67
Medlicott, H. B., on the geology of the Sub-Himálaya, ... 485
Mines of Khetree, ... 519
Minerals of Burmah, ... 423
Meteorological Committee; Memorandum on Proceedings of the, 601
——————————; Report, ... 605
Meteorological Observations at Calcutta, ... i seq.
——————— Gangaroowa, Kandy, ... i seq.
Meteorology, correspondence on, ... 605
Meteorites, Society's Collections of, ... 72
Museum, Council's Report on the, ... 71
——— Correspondence on the transfer to Government, 76, 462, 599
Naturalists; report on proposed list of, ... 65
Naturalists, List of, i; See Appendix,
Oldham, T.; on a fossil amphibian from Central India, ... 443
————; on Spiti fossils, ... 67, 232, 597
————; on Stone implements from Madras,... ... 67
O'Riley, E., on the Lake of clear water, ... 39 seq.
Paradoxurus, new species, ... 188
Peat bed beneath Calcutta, ... 155
Pegu Fisheries, ... 39, 195
Phillips, Professor J., on Spiti fossils, ... 577

Digitized by Google

	Page
Physical Geography of Burmah, Shan Mountains and Yunan, ...	414
Political condition of Kahkyen hills, Western China, ...	407
Produce of Western China, ...	425
Rangoon Meridional Series, G. T. S., ...	390
Ratian hill range; vegetation, ...	305
Ravines of Jhelum district, vegetation of, ...	308
Report of Meteorological Committee, ...	605
Salt Plains, vegetation of, ...	311
Salt Range of Punjab, vegetation of, ...	313
Salt water aquaria, ...	534
Schlagintweit R. de, on the hot springs of India and High Asia,	49
Sealdah, Calcutta; tank section, ...	154
Sea-level, mean, ...	394
Sim, Lieut. C. A., on a fossil, amphibian from Central India, ...	461
Shaikh Boodeen; Geology of, ...	878
Spiti fossils, note and remarks by T. Oldham, Esq., 67, 232,	597
———————, by Professor John Phillips, ...	577
South Bombay Meridional Series, G. T. S., ...	391
Stoliczka, Dr. F., note on Lagomys Curzoniæ, Hodgson, ...	600
Stone implements from St. Acheul, exhibited at Socy.'s Meeting,	574
——————— from Madras; exhibited at Society's Meeting,	67
Sub-Himálayan geology, ...	485
Sundree trees buried in situ, ... 155,	157
Surafar Hill Range, vegetation of, ...	305
Sutlej Series, G. T. S., ...	390
Tank Section at Sealdah, ...	154
Tertiary rocks of Batannee hills,...	379
Theobald, W., Junior, on the variation of new species of *Helicidæ*,	238
Tickell, Col., S. R., on *Hylobates lar*, ...	196
——————— ; Memo. on three Andamanese, ...	162
Tides, mean level at Kydd's Dock, Calcutta, ...	393
Tilla Mount, vegetation of, ...	315
Tipperah; G. T. Survey, ...	386
Trade route to Western China viâ Burmah, ...	407
Tytler, Col. R. C., on intercourse with Andaman Islanders, ...	31
———————, on a new species of Paradoxurus, ...	188
———————, on salt water aquaria, ...	534
———————, on a few species of Geckos, ...	535
Variability of iron compensation bars, ...	382
Variation of Indian and Burmese *Helicidæ*, ...	238
Vegetation of Jhelum district, ...	290
Vizagapatam G. T. S. base line,...	381
Vocabulary, Andamanese, ...	170
Walker, Lieut.-Col., J. T., on the operations of the G. T. Survey,	381
Williams, Dr. C., on trade route to Western China, viâ Burmah, ... 407,	486

INDEX II.

NEW GENERA AND SPECIES DESCRIBED IN THE ZOOLOGICAL MEMOIRS.

Page

I. Mammalia.

Paradoxurus Tytlerii, Tytler, ... 188

II. Aves.

Didunculus Strigirostris, ... 373

III. Reptilia.

Gecko caracal, Tytler, ... 547
„ chameleon, Tytler, ... 548
„ chaus, Tytler, ... 547
„ Harriettæ, Tytler, ... 548
„ pardus, Tytler, ... 547
„ tigris, Tytler, ... 546
„ Tytleri, Tytler, ... 547
„ Verreauxi, Tytler, ... 546

IV. Mollusca.

Clausilia Masoni, Theobald, ... 246
Cyclophorus artheiticus, Theobald, ... 246
Helix exul, Theobald, ... 245
Hoplites gen, Theobald, ... 244
Limax viridis, Theobald, ... 244
Pomatias Peguense, Theobald, ... 248
Pupina Blanfordi, Theobald, ... 247
Streptaxis Birmanica, W. T. Blanford, ... 245
Streptaxis Blanfordi, Theobald, ... 245
Vaginulus Birmanicus, Theobald, ... 243
Vitrina Christianæ, Theobald, ... 245
Ditto Peguensis, Theobald, ... 244

INDEX III.

HISTORY, LITERATURE, PHILOLOGY, ARCHÆOLOGY.

The Roman figures refer to the paging of the Supplement.

Abbott, Col. James, Memo. on the Elephant Statues in the Delhi palace, ... 375
Abul Fazl, ... xii
Adilabad, Fort of, ... iv, lxxiv
Ajunta Cave Temples, ... 216
Akhúnds of Panjkorah, ... 145
Ala-uddin Gateway, ... lxiv

Digitized by Google

Page

Ala-uddin Minar, ... lxv
Alphabet, value of, ... 510 seq.
Altamish, tomb of, ... lxiv
Alumgeer serai, account of, ... 406
Anang Pâl, date of, ... xi seq.
——— the second, sons of, ... xx
——— the works of, ... xix
Andamanese Vocabulary, ... 170
Antiquities of Guzerat, on, ... 402 seq.
Archæological Survey Report for 1862-63, ... i
Archæologists, Numismatists, List of, see Appendix, ... xi
Arch, knowledge of the Hindus of the construction of the, ... 176
Arian Alphabet, ... 253
Asoka's Edicts, ... xxvii, xxix, xxxi
——— pillars, ... xxix, xxxiii
Austen, Captain H. H. Godwin, Abstract of his paper on the mystery plays in the Monasteries of Ladak, ... 584
——————— On the system employed in Outlining the Figures of deities, &c. in Ladak, Zaskar, &c., ... 151
Barsoor Ruins and Antiquities, ... 44
Bibliotheca Indica, Publication of the Muhammadan Historians in, ... 464 seq.
Bowring, L. B., Letter on Inscriptions in Mysore, ... 208
——————— On an Inscription at Taikal, ... 573
Buddha Gayá, on the Ruins of, ... 173
Buddha Gayá temple, age of, ... 186
Buddhapad at Buddha Gayá, ... 179
Buddhist Missionaries in Ireland, ... 555
Buddhist Missionaries to Burmah and the Talaing country, 13, 26
Buhler, Dr. E., On Çákaṭáyana's Sanskrit Grammar, ... 202
Burmah race, history of the, ... 1
Burmese nation, their origin and original country, ... 22
Burmese, origin of religion and letters of, ... 29
Bustar, Report on, ... 44
Çákaṭáyana's Grammar, ... 202
Campbell, C., Memorandum on the Elephant Statues of Delhi, 159
Chaityas in Buddhist Monasteries, ... 370
Chand's work, ... xxv
Chitore, conquest of, ...lxxxii
Chohan conquest of Delhi, ... xxi, xxii
——— dynasty, ... xxiii, xxiv
Churtuns in Ladak, Zaskar, ... 153
Coins current in the Guzerat districts, table of, ... 434
—— from Assam, ... 581
Coins from Cooch Behar, note on, ... 480
Coins (undescribed) from the Cooch Behar trove, Remarks on, 579
Coins (Zodiacal) of Jehangir, note on, ... 483
Cooch Behar trove of coins, on, ... 480

Page

Cunningham, Major-General A., Archæological Survey Report for 1862-63, ... i.
——————— Note on the Bactro-Pali Inscription from Taxila, 35
——————— On the races of the Panjab, ... 441
——————— Remarks on the date of the Pehewa Inscription of Raja Bhoja, ... 223
——————— Results of a tour thro' the Panjab, ... 332
Daidala of Ptolemy, its probable identity with Delhi, ... x
Delhi, date of foundation, ... ix
——————— refounding, ...x seq.
——— Ruins of, ... ii
——— Shirshah, ... lxxviii
——— Traditional history, ... vi
Din-panah, ... lxxviii
Elephant Statues in the Delhi Palace, ... lxxxi, 159, 375
Ellora cave temples, ... 216
Eran Inscription, ... 38
Fakirs or Raæyats of Afghanistan, ... 148
Figures of Deities, on the delineation of, ... 151
Firuzabad, city of, ... lxxv
Firuz Shah's pillar, ... xxvii, xxx
Firuz Tughlak, works of, ... lxxv
Forts (Seven) of Delhi, ... iv
Fyzabad district, ancient localities, ... 81
Gates of Delhi, ... lxxiv
Gates of the city of Shajahánábád, ... lxxx seq.
Glasfurd, Captain C., Report on Bustar, ... 44
"Golden Pillar" of Delhi, ... xxx
Grammatical forms of the Hindvi, on the, ... 494 seq.
Great Masjid of Delhi, ... xxxviii. seq., lxvii
——————— mason's marks on pillars of, ... xlii
Guzerat Antiquities, ... 402 seq.
———, Coins current in, ... 434
Hailan Inscription, ... 549 seq.
Hailan, ruins at, ... 404
Hindu remains of Delhi, ... xxvii, seq.
Hindustani Language, Remarks on, ... 356
Hindvi Language, on the Origin of and its relation to the Urdu, ... 469, 489 et seq.
Holmboe, Prof., on the ancient relations of Asia and Scandinavia, 333
——————— On the origin of the system of weights in Ancient Scandinavia, ... 199
Humáyun's tomb, ... lxxix
Ighúrí or the Turki Cycle, ... 284
Indraprastha, ... iv
Indrpat, Fort of, ... lxxviii
Inscription at Bustar, ... 46

Digitized by Google

Page

Inscription at Cuttack, ... 82
———— at Taikal, ... 574
———— from Pehewa, ... 223
———— from Taxila, note on an, ... 35
———— on a copper-plate from Dighwa in Chhuprah, 327, seq.
———— on a figure of Buddha at Buddhagayá, ... 177
———— on ancient Tiles from Pugan, ... 57, 372
———— on the Muqbura at Hailan, ... 549 seq.
Inscriptions from Mysore, ... 208
———— on Kutb Minar, ... lxi
———— (Persian) in Srinagar, ... 278, 280
———— on iron pillar at Delhi, ... xxxv, xxxviii
Iron pillar of Delhi, ... xxxiv
———— Inscriptions on, ... xxxv, xxxviii
Islamghur, notice of, ... 405
Jáhánárá, epitaph on the tomb of, ... lxxxvi
Jahán-panáh, City and Fort of, ... lxvii
Jains in Mysore, traces of, ... 209
Jâma Masjid, ... xxxviii, xlii, xlvii
Kâla Masjid, ... lxxvi
Kanauj Kings, ... 324
———— History of the dynasties of, ... 231
———— Rajahs, ... xiv, xxxviii
Karens, tradition of, ... 23
Karna Pál, sons of, ... xxi
Káshkar, Upper and Lower, account of, ... 125
Kashkari vocabulary, ... 272
Kau-le-yá Princes of Burmah, origin of, ... 5
Kharg Rai, ... viii, xi
Kharian baolee, ... 405
Khawaspore serai, ... 405
Kilah Alai, Fort of, ... iv, lxvi
Kutab Minár, ... 1 seq.
Kutila character, on the use of, ... 225
Ladak and Zaskar, system employed in outlining figs. of Deities in, 151
Lálkot, fort of, ... iv, xviii, xliii, lxvi
Land grant of Mahendrapála Deva, ... 321
Lees, Captain W. N., On the Application of the Roman alphabet to Oriental Languages, ... 345
———— On the Etymology of the word *Seraffin*, 584 seq.
———— On the publication of the Muhammadan Historians, 464 seq.
List of Kafir, Kohistani and other words, ... 272 seq.
List of Kanouj Kings, ... 324
Literary Intelligence, Correspondence, &c., ... 59, 199, 332, 441
Loewenthal, Rev. I., On Persian Inscriptions, ... 278
Logan, J. R., on the settlement of the Mon-Anam nations, ... 24
Mackenzie, Captain H., On the Antiquities of Guzerat, 402 seq.

Digitized by Google

Page

Maha Radza Weng or the Chronicles of the Kings of Burmah, 1
Mahendrapála Deva of Kanauj, ... 321 seq.
Malnád Inscriptions, ... 208
Melville, Captain A. B., On Mystery plays performed in Ladak, 478
Metric Systems, List of Ancient,... ... 262 note
Moong, Coins found in, ... 405
Mosque of Shahi Hamadán, ... 278 seq.
Mran-má or Myan-má, on the etymology of, ... 18
Muhammadan Historians, Publication of, ... 464 seq.
Muhammadan remains of Delhi, ... xlvi
Muhammad Tughlak's fortifications of Delhi, ... lxxiv
Mulheran, J., Letter on Caves of Ajunta and Ellora, ... 216
Musalmăn conquest of Delhi, ... xxv
Mystery plays in Ladak, ... 478, 584
Numismatists, Archæologists, List of, see Appendix, ... xi
Ohind Inscription, ... 37
Ouseley, Ralph, Capt., letter on some ancient localities in the Fyzabad District, ... 81
Panjab races, ... 441
Panj-Korah, account of, ... 136
Panj-Korah, villages, clans, &c.,... 140
Páthán kings of Bengal and Delhi, List of, ... 482
Patu Kothee, ruins of, ... 404
Pehewa inscription, date of, ... 223
———— On the Reading of, ... 330
Phayre, Lieut.-Col. A. P., Memorandum upon some Ancient Tiles from Pugan, ... 57
———— ———— on the history of the Burmah race, 1
Philological Committee's Report, ... 218
Pillar Towers of the British Islands, ... 552 seq.
Prithvi Rája, work attributed to, ... xxvi
Produce of Panj-korah, ... 138
Pugan, note on some ancient Tiles obtained at, ... 57
Puráná Kila, ... lxxviii
Rahtor Kings of Kanouj, ... xvii
Rai Pithora Fort, ... xlv
Rájendralála Mitra, note on the Cooch Behar trove of Páthán coins, ... 480
———— Note on two Assam silver coins, ... 581
———— ———— On a Land-grant of Mahendrapála Deva of Kanauj, ... 321 seq.
———— On the Buddhist remains of Sultanganj, ... 360
———— On the origin of the Hindvi and its Relation to the Urdu Dialect, ... 469, 489
———— On the Ruins of Buddha Gayá, ... 173
———— Remarks on some undescribed coins from the Cooch Behar trove, ... 579

Digitized by Google

Page

Raverty, Capt. H. G., An account of Upper Káshkár, &c., ... 125
——————— On the Language of the Sí-áh-posh Kafirs, ... 267
Report of the Proceedings of the Archæological Surveyor to the Government of India for the season of 1862-63, ... i
Roman Alphabet applied to Oriental Languages, ... 345
Romanizing of Hindi, on the question of, ... 505
Romanizing of Oriental Alphabets, discussion on the question of, 446
Round Towers in Asia, Egypt, &c., ... 565 seq.
Rungalála Banerjee, letter on an Inscription from Cuttack, ... 82
Russool, antiquities of, ... 405
Salimgarh, Fort of, ... lxxix
Scandinavian weights, on the origin of the system of, ... 199
Seraffin, on the etymology of, ... 584 seq.
Sháhi Hamadán, ... 280
Shâhpur, ... lxvi
Shajahânâbâd citadel and city, ... lxxx
Shir Mandir, ...lxxviii
Sí-áh-posh Kafirs, Language of, ... 267
Siri, Fort of, or Kilah Alai, ... iv, lxvi
Srinagar Inscriptions, ... 278, 280
Srughna, site of, ... xxviii
Stone implements from Madras, ... 67
Sultánganj, on the Buddhist remains of, ... 360
Syud Ahmad, on the Kutab Minar, ... lii, lxii, lxiii
Tálásh, district of, ... 150
Taxila inscription, ... 35
Thomas, E., On Ancient Indian Weights, ... 251
Tiles from Pugan, ... 57, 372
Tomar dynasty of Delhi, ... xvi
——— Kings, possessions of, ... xx, xxi
Tughlakabad, Fort of, ... iv, lxix seq.
Tughlak Shah's tomb at Delhi, ... lxxii seq.
Vikramáditya, date of, ... viii seq.
Visála Deva's Inscription, ... xxxi seq.
Wardak Inscription, remarks on the reading of the, ... 37
Weber, Dr. A., letter to Mr. Cowell, ... 59
Weights, ancient Scandinavian, ... 199, 333
———, on Ancient Indian, ... 251, 264
Wise, Dr. T. A., on the Pillar Towers of the British Islands, ... 552 seq.
Yusufzis, the country of the, ... 135
Zain ul' Ábidín, Tomb of, ... 281

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INDEX IV.

GENERAL.

Page

Address presented by the Society to His Excellency the Right Hon'ble Sir John Lawrence, ... 211
Asiatic Society of Bengal, Annual Report of, for 1863, ... 68
——————— Proceedings of, 61, 65, 68, 114, 210, 335, 442, 459, 477, 573, ... 597
Blyth, E., Recognition of his services by the Society, ... 582
Library of the Asiatic Society, Report of accessions to, 117, 451, 589
Members of the Asiatic Society, List of, ... 101
Reply of Sir John Lawrence, to the President and Members of the Asiatic Society, ... 212
Report, annual, of the Asiatic Society for 1863,... ... 68
Statement of Receipts and Disbursements for 1863, 85 seq.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11. Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.491	29.529	29.449	0.080	81.7	86.7	78.6	8.1
2	.499	.551	.455	.096	82.5	86.8	77.0	9.8
3	*Sunday.*							
4	.550	.605	.497	.108	82.4	85.2	81.0	4.2
5	.510	.566	.453	.113	80.0	83.0	76.8	6.2
6	.505	.544	.458	.086	81.6	86.0	77.8	8.2
7	.570	.629	.537	.092	82.5	85.8	79 2	6.6
8	.588	.633	.533	.100	84.1	89.4	80.0	9.4
9	.579	.638	.515	.123	84.2	89.8	79.4	10.4
10	*Sunday.*							
11	.596	.661	.523	.138	82.9	87.8	80.6	7.2
12	.518	.575	.436	.139	85.0	89.6	81.2	8.4
13	.470	.516	.406	.110	83.6	90.2	77.2	13.0
14	.433	.474	.377	.097	84.2	89.2	82.3	6.9
15	.423	.485	.352	.133	84.3	88.8	81.6	7.2
16	.413	.463	.336	.127	84.2	89.4	81.6	7.8
17	*Sunday.*							
18	.397	.441	.346	.095	83.4	87.4	80.8	6.6
19	.439	.525	.397	.128	84.7	91.2	80.6	10.6
20	.412	.476	.328	.148	82.8	86.0	81.0	5.0
21	.362	.421	.313	.108	82.0	85.4	80.0	5.4
22	.480	.543	.394	.149	80.9	83.7	79.4	4.3
23	.522	.568	.468	.100	84.6	88.8	80.6	8.2
24	*Sunday.*							
25	.519	.564	.467	.097	86.2	89.6	82.6	7.0
26	.520	.563	.475	.088	85.4	90.4	81.0	9.4
27	.531	.582	.489	.093	82.9	86.4	80.4	6.0
28	.573	.625	.521	.104	83.7	86.4	81.2	5.2
29	.610	.669	.559	.110	84.8	89.4	82.6	6.8
30	.615	.659	.563	.096	83.3	85.2	79.2	6.0
31	*Sunday.*							

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly Observations made, during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.7	3.0	76.6	5.1	0.899	9.67	1.70	0.85
2	79.8	2.7	77.9	4.6	.937	10.06	.58	.86
3	*Sunday.*							
4	79.1	3.3	76.8	5.6	.905	9.71	.90	.84
5	77.4	2.6	75 6	4.4	.871	.40	.41	.87
6	77.8	3.8	75.1	6.5	.857	.21	2.13	.81
7	78.9	3.6	76.4	6.1	.893	.60	.04	.83
8	79.4	4.7	76.1	8.0	.885	.48	.73	.78
9	79.6	4.6	76.4	7.8	.893	.56	.68	.78
10	*Sunday.*							
11	80.0	2.9	78.0	4.9	.940	10.09	1.70	.86
12	81.1	3.9	78.4	6.6	.952	.17	2.36	.81
13	80.4	3.2	78.2	5.4	.946	.15	1.88	.84
14	81.3	2.9	79.3	4.9	.979	.48	.76	.86
15	80.8	3.5	78.3	6 0	.949	.16	2.12	.83
16	80.4	3.8	77.7	6.5	.931	9.96	.28	.81
17	*Sunday.*							
18	80.7	2.7	78.8	4.6	.964	10.34	1.62	.87
19	81.4	3.3	79.1	5.6	.973	.40	2.02	.84
20	80.3	2.5	78.5	4.3	.955	.27	1.48	.87
21	78.8	3.2	76.6	5.4	.899	9.67	.80	.84
22	78.8	2.1	77.3	3.6	.919	.90	.20	.89
23	80.7	3.9	78.0	6.6	.940	10.05	2.34	.81
24	*Sunday.*							
25	80.6	5.6	76.7	9.5	.902	9.60	3.39	.74
26	80.3	5.1	76.7	8.7	.902	.62	.06	.76
27	79.7	3.2	77.5	5.4	.925	.94	1.85	.84
28	80.8	2.9	78.8	4.9	.964	10.34	.73	.86
29	81.0	3.8	78.3	6.5	.949	.14	2.32	.81
30	80.4	2.9	78.4	4.9	.952	.21	1.72	.86
31	*Sunday.*							

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.521	29.636	29.412	0.224	82.1	86.4	78.8	7.6
1	.505	.610	.403	.207	81.9	85.6	78.6	7.0
2	.499	.596	.378	.218	81.4	85.2	77.4	7.8
3	.488	.594	.355	.239	81.2	84.9	77.0	7.9
4	.482	.602	.344	.258	80.7	84.2	77.4	6.8
5	.494	.605	.353	.252	80.7	83.2	76.8	6.4
6	.510	.635	.385	.250	80.6	82.6	77.0	5.6
7	.520	.644	.385	.259	81.2	83.4	77.6	5.8
8	.532	.647	.381	.266	82.5	84.8	77.6	7.2
9	.541	.661	.373	.288	83.8	86.6	79.0	7.6
10	.543	.660	.360	.300	84.7	88.1	80.2	7.9
11	.539	.652	.341	.311	85.4	88.6	80.0	8.6
Noon.	.527	.641	.338	.303	86.3	90.2	80.2	10.0
1	.510	.625	.334	.291	86.5	90.4	79.8	10.6
2	.489	.604	.313	.291	86.1	91.2	80.0	11.2
3	.471	.581	.313	.268	85.8	89.8	80.2	9.6
4	.459	.576	.314	.262	85.8	89.6	80.0	9.6
5	.458	.582	.319	.263	84.9	88.4	80.4	8.0
6	.461	.582	.332	.250	84.4	87.3	80.0	7.3
7	.480	.601	.355	.246	83.5	86.6	80.0	6.6
8	.499	.627	.381	.246	82.9	86.0	80.1	5.9
9	.517	.655	.389	.266	82.7	85.4	80.0	5.4
10	.532	.669	.399	.270	82.6	85.4	80.2	5.2
11	.535	.661	.421	.240	82.3	86.2	79.2	7.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.3	2.8	77.3	4.8	0.919	9.88	1.63	0.86
1	79.2	2.7	77.3	4.6	.919	.88	.56	.86
2	78.8	2.6	77.0	4.4	.910	.81	.46	.87
3	78.6	2.6	76.8	4.4	.905	.75	.46	.87
4	78.1	2.6	76.3	4.4	.890	.61	.43	.87
5	78.4	2.3	76.8	3.9	.905	.75	.29	.88
6	78.4	2.2	76.9	3.7	.908	.78	.23	.89
7	78.9	2.3	77.3	3.9	.919	.90	.31	.88
8	79.5	3.0	77.4	5.1	.922	.91	.73	.85
9	80.0	3.8	77.3	6.5	.919	.84	2.26	.81
10	80.3	4.4	77.2	7.5	.916	.79	.63	.79
11	80.8	4.6	77.6	7.8	.928	.91	.77	.78
Noon.	81.3	5.0	77.8	8.5	.934	.95	3.07	.76
1	81.6	4.9	78.7	7.8	.961	10.24	2.86	.78
2	81.4	4.7	78.1	8.0	.943	.06	.89	.78
3	81.3	4.5	78.1	7.7	.943	.06	.77	.78
4	81.1	4.7	77.8	8.0	.934	9.97	.86	.78
5	80.8	4.1	77.9	7.0	.937	10.02	.47	.80
6	80.6	3.8	77.9	6.5	.937	.02	.29	.81
7	80.3	3.2	78.1	5.4	.943	.12	1.88	.84
8	79.9	3.0	77.8	5.1	.934	.03	.76	.85
9	79.7	3.0	77.6	5.1	.928	9.97	.75	.85
10	79.8	2.8	77.8	4.8	.934	10.03	.65	.86
11	79.5	2.8	77.5	4.8	.925	9.94	.64	.86

All the Hygrometrical elements are computed by the Greenwich Constants.

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act of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Solar Radiation, Weather, &c.

radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	Inches		lbs	
	3.13	S. & S. W.	0	Cloudy: also drizzling from midnight to 5 A. M. & raining between 8 & 9 A. M. & from 5 to 9 P. M.
	0.64	S. & S. W.	1¾	Cloudy: also raining from 2 to 6 A. M. & at 9 A. M.
	...	*Sunday.*	1½	
	...	S.	1	Cloudy: also drizzling at 2-3 & 5 P. M.
	0.48	S.	4	Cloudy: also thundering and lightning at 4 & 5 A. M. & raining from 4 A. M. to 2 P. M.
	0.15	S. & S. E.	3¼	Cloudless till 7 A. M. cloudy afterwards; also raining between 1 & 2 P. M. & at 6 P. M.
	0.19	S. & S. E.	1¼	Cloudy till 7 P. M. cloudless afterwards; also drizzling at 4 & 6 A. M. & at 2 P. M.
4	...	S. E & S.	4	Cloudless till 6 A. M. Scatd. ⌣i & ∩i afterwards, also slightly drizzling between 10 & 11 A. M.
0	...	S. & S. E.	2½	Scatd. clouds: also very slightly drizzled at 2 A. M.
	} 0.74	*Sunday.*	3¼	
		S. & S. E.	1	Scatd. ∩i till 6 A. M. cloudy till 8 P. M. cloudless afterwards; also raining at 9 & 10 A. M. & at 2 & 6 P. M.
7	...	S.	2¾	Cloudless till 5 A. M. Scatd. clouds afterwards.
4	0.84	S.	8	Cloudless till 3 A. M. cloudy afterwards; also raining at 5 A. M. & between 1 & 2 P. M.
)	0.10	S. & S. E.	1	Cloudy; also slightly raining at 1 P. M.
	0.10	E. & S. E.	3	Scatd. clouds till 11 A. M. cloudy afterwards; also drizzling at 1 & 2 P. M. & between 6 & 7 P. M.
)	0.22	E.	3¾	Cloudy; also raining at 1 P. M.
	0.43	*Sunday.*	3¾	
	1.72	S. E. & N. E.	1¾	Cloudy; also raining after intervals.
)	...	S. E. & S. & E.	2¼	Cloudy; also drizzling at 3 & 11 A. M. & at 3 P. M. & thundering and lightning at 10 & 11 P. M.

i,—i Strati, ∩i Cumuli, ⌣i Cirro strati, ∩i Cumulo strati, ⌣i Nimbi,) cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
20	...	0.60	E. & variable.	3¼	Cloudy; also drizzling from 9 A. M. to 3 P. M. & thundering at 2 P. M.
21	...	0.14	E. (high.)	8½	Cloudy; also raining at 2 & 10 A. M. & at 7, 9 & 10 P. M.
22	...	0.61	S. & E.	3½	Cloudy; also raining at 9 & 11 A M. & from 2 to 4 P. M. & at 7 & 8 P. M. & thundering at 3 P. M.
23	117.0	0.16	S. & S. E.	2¾	Scatd. clouds; also raining at 2 P. M.
24	...	...	*Sunday.*	3¼	
25	...	...	W. & S. & S. W.	3	Cloudy; also slightly drizzling at Midnight.
26	120.0	0.98	W. & S.	8¾	Cloudy; also raining between 2 & 3 A. M. & at 7 & 11 P. M. & thundering at 7 P. M.
27	...	0.58	W. & S. W.	2¼	Cloudy; also raining from 6 to 8 A. M. & at 11 A. M. & from 6 to 9 P. M.
28	...	...	S. & W. & S. W.	1¾	Cloudy; also drizzling at 1 & 11 A. M.
29	125.0	...	S. & W.	2¼	Cloudy; also drizzling at 2 A. M. & at 5, 6, 10 & 11 P. M. & thundering at 2 A. M.
30	...	0.22	S. & S. W.	3	Cloudy; also drizzling after intervals.
31	...	1.06	*Sunday.*	4½	

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.505
Max. height of the Barometer occurred at 10 P. M. on the 29th, ..	29.669
Min. height of the Barometer occurred at 2 & 3 P. M. on the 21st, ..	29.313
Extreme range of the Barometer during the month, ...	0.356
Mean of the Daily Max. Pressures,..	29.558
Ditto ditto Min. ditto, ...	29.448
Mean daily range of the Barometer during the month, ...	0.110
	o
Mean Dry Bulb Thermometer for the month, ...	83.4
Max. Temperature occurred at 2 P. M. on the 19th, ...	91.2
Min. Temperature occurred at 5 A. M. on the 5th, ...	76.8
Extreme range of the Temperature during the month, ...	14.4
Mean of the daily Max. Temperature, ...	87.6
Ditto ditto Min. ditto, ...	80.1
Mean daily range of the Temperature during the month, ...	7.5
Mean Wet Bulb Thermometer for the month, ...	79.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	3.5
Computed Mean Dew-point for the month, ...	77.4
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	6.0
	Inches
Mean Elastic force of Vapour for the month, ...	0.922
	Troy grains
Mean Weight of Vapour for the month, ...	9.89
Additional Weight of Vapour required for complete saturation, ..	2.07
Mean degree of humidity for the month, complete saturation being unity,	0.83
	Inches
Rained 27 days, Max. fall of rain during 24 hours, ...	3.13
Total amount of rain during the month, ...	13.09
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	13.42
Prevailing direction of the Wind, ...	S.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	1		1		3		2		11	1	3	1	2	1					3
1			1		4		3		11	1	3	1	4	1					
2			1	1	5	1	4	1	10	2	2		4	2					
3	1		1		4	1	4		8	2	2	1	4	1	1				1
4	1		1		3		3	1	6	1	2	1	5	1					5
5	1		1	1	4		5		7	1	1	1	4	1	1	1			2
6	1		1		3		6	1	8		2	1	4	1	1				
7	1		1	1	4		5		7	1	3		4	1	1				
8	1				5	1	5		7	1	4		3	1	1				
9	1	1			3		6	1	8	4	3	1	5						
10					3	1	5		12	3	2		4	1					
11			1		2		5	3	10	2	4	1	4						
Noon.			1		2		2		11	1	4		5		1	1			
1	1	1			1		3	2	10		3	1	7	1	1				
2					3	1	2		9	4	3		8	4	1	1			
3					3		3	1	11	2	4		4		1	1			
4					3		1	1	15	1	4		2		1				
5					4		4		14	2	3	1	1						
6					4		3	1	15	3	3	1	1						
7					3	1	4		18	5			1	1					
8					3		4		17	2			1	1					1
9					3	1	5		16	1			1	1					1
10					4	1	6		15	1			1						
11					4		6	1	13	2	2	1	1						

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11. Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.555	29.603	29.479	0 124	82.9	89.2	78.4	10.8
2	.537	.587	.480	.107	83.6	88.0	80.0	8.0
3	.538	.582	.462	.120	82.0	87.1	78.4	8.7
4	.564	.607	.524	.083	82.0	85.8	79.7	6.1
5	.545	.581	.500	.081	81.8	85.6	80.0	5.6
6	.491	.549	.422	.127	82.8	86.6	80.4	6.2
7	*Sunday.*							
8	.435	.555	.377	.178	80.6	84.4	79.0	5.4
9	.575	.621	.531	.090	80.6	82.0	78.0	4 0
10	.580	.616	.541	.075	81.7	83.9	80.0	3.9
11	.551	.614	.481	.133	84.8	90.0	80 2	9.8
12	.466	.535	.373	.162	83.6	86.2	81.2	5.0
13	.371	.446	.269	.177	81.8	85.8	79.0	6.8
14	*Sunday.*							
15	.688	.748	.640	.108	82.7	87.6	78.6	9.0
16	.665	.729	.599	.130	84.5	89.6	81.0	8.6
17	.656	.705	.611	.094	85.5	90.2	82.0	8.2
18	.671	.719	.617	.102	85.6	88.6	83.7	4.9
19	.674	.725	.617	.108	85.1	88.4	81.8	6.6
20	.709	.771	.637	.134	82.8	86.2	79.6	6.6
21	*Sunday.*							
22	.748	.798	.673	.125	81.7	87.3	77.0	10.3
23	.718	.791	.645	.146	82.5	87.0	78.2	8.8
24	.712	.764	.651	.113	83.4	87.6	79.2	8.4
25	.743	.798	.689	.109	83.4	89.4	79.4	10.0
26	.748	.806	.683	.123	84.1	89.6	80.2	9.4
27	.721	.778	.648	.130	85.1	91.0	81.2	9.8
28	*Sunday.*							
29	.742	.810	.667	.143	85.7	90.4	81.8	8.6
30	.702	.767	.612	.155	86.9	92.2	81.8	10.4
31	.694	.720	.617	.103	81.9	86.6	79.2	7.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly Observations made during the day.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	78.9	4.0	76.1	6.8	0.885	9.50	2.29	0.81
2	80.2	3.4	77.8	5.8	.934	10.01	.02	.83
3	79.3	2.7	77.4	4.6	.922	9.91	1.56	.86
4	79.0	3.0	76.9	5.1	.908	.76	.71	.85
5	79.1	2.7	77.2	4.6	.916	.85	.55	.86
6	79.6	3.2	77.4	5.4	.922	.91	.84	.84
7	*Sunday.*							
8	78.1	2.5	76.3	4.3	.890	.61	.40	.87
9	78.7	1.9	77.4	3.2	.922	.95	.06	.90
10	79.6	2.1	78.1	3.6	.943	10.14	.23	.89
11	81.1	3.7	78.5	6.3	.955	.23	2.23	.82
12	81.0	2.6	79.2	4.4	.976	.48	1.55	.87
13	78.8	3.0	76.7	5.1	.902	9.70	.70	.85
14	*Sunday.*							
15	79.6	3.1	77.4	5.3	.922	.91	.81	.85
16	80.4	4.1	77.5	7.0	.925	.90	2.45	.80
17	81.3	4.2	78.4	7.1	.952	10.17	.55	.80
18	81.2	4.4	78.1	7.5	.943	.06	.70	.79
19	81.2	3.9	78.5	6 6	.955	.21	.36	.81
20	79.3	3.5	76 8	6.0	.905	9.71	.04	.83
21	*Sunday.*							
22	78,2	3.5	75.7	6.0	.873	.40	1.97	.83
23	79.0	3.5	76.5	6.0	.896	.63	2.01	.83
24	79.6	3,8	76.9	6.5	.908	.72	.24	.81
25	79.6	3.8	76.9	6.5	.908	.72	.24	.81
26	79.8	4.3	76.8	7.3	.905	.69	.52	.79
27	80.4	4.7	77.1	8.0	.913	.76	.81	.78
28	*Sunday.*							
29	81.0	4.7	77.7	8.0	.931	.94	.86	.78
30	81.8	5.1	78.7	8.2	.961	10.24	3.01	.77
31	78.4	3.5	75.9	6.0	.879	9.46	1.98	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.636	29.773	29.442	0.331	81.7	84.4	77.0	7.4
1	.630	.754	.424	.330	81.5	84.4	77.4	7.0
2	.621	.752	.405	.347	81.1	84.0	77.4	6.6
3	.609	.743	.383	.360	80.8	83.0	77.5	5.5
4	.603	.737	.377	.360	80.6	84.0	77.6	6.4
5	.611	.749	.381	.368	80.5	83.9	77.8	6.1
6	.629	.769	.397	.372	80.5	83.7	77.5	6.2
7	.643	.784	.404	.380	81.1	84.2	78.4	5.8
8	.657	.800	.403	.397	82.4	85.4	79.4	6.0
9	.665	.810	.370	.440	83.7	87.2	79.2	8.0
10	.666	.803	.395	.408	84.8	87.9	78.0	9.9
11	.659	.795	.385	.410	85.6	89.4	78.4	11.0
Noon.	.644	.779	.372	.407	86.0	89.6	80.0	9.6
1	.625	.760	.358	.402	86.6	91.6	81.0	10.6
2	.603	.733	.334	.399	86.6	92.2	81.5	10.7
3	.580	.703	.309	.394	86.7	92.2	81.2	11.0
4	.568	.691	.318	.373	86.1	92.2	81.4	10.8
5	.564	.708	.335	.373	84 9	91.4	81.2	10.2
6	.577	.703	.303	.400	83.8	89.4	80.6	8.8
7	.588	.721	.297	.424	83.3	88.6	80.4	8.2
8	.608	.755	.269	.486	82.9	87.5	79.8	7.7
9	.628	.767	.349	.418	82.6	86.8	78.4	8.4
10	.639	.771	.377	.394	82.3	85.8	79.0	6.8
11	.640	.771	.385	.386	82.1	85.4	79.0	6.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.3	2.4	77.6	4.1	0.928	9.99	1.38	0.88
1	79.2	2.3	77.6	3.9	.928	.99	.32	.88
2	78.9	2.2	77.4	3.7	.922	.93	.24	.89
3	78.6	2.2	77.1	3.7	.913	.84	.23	.89
4	78.4	2.2	76.9	3.7	.908	.78	.23	.89
5	78.4	2.1	76.9	3.6	.908	.78	.20	.89
6	78.2	2.3	76.6	3.9	.899	.69	.29	.88
7	78.7	2.4	77.0	4.1	.910	.81	.36	.88
8	79.3	3.1	77.1	5.3	.913	.82	.79	.85
9	79.9	3.8	77.2	6.5	.916	.81	2.26	.81
10	80.2	4.6	77.0	7.8	.910	.73	.73	.78
11	80.6	5.0	77.1	8.5	.913	.74	3.02	.76
Noon.	80.8	5.2	77.2	8.8	.916	.77	.14	.76
1	81.0	5.6	77.6	9.0	.928	.89	.25	.75
2	81.1	5.5	77.8	8.8	.934	.95	.19	.76
3	81.1	5.6	77.7	9.0	.931	.92	.26	.75
4	81.0	5.1	77.4	8.7	.922	.83	.12	.76
5	80.5	4.4	77.4	7.5	.922	.85	2.64	.79
6	80.1	3.7	77.5	6.3	.925	.92	.18	.82
7	80.1	3.2	77.9	5.4	.937	10.06	1.87	.84
8	79.8	3.1	77.6	5.3	.928	9.97	.82	.85
9	79.7	2.9	77.7	4.9	.931	10.00	.68	.86
10	79.6	2.7	77.7	4.6	.931	.00	.58	.86
11	79.5	2.6	77.7	4.4	.931	.02	.49	.87

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches		lbs	
1	130.0	...	S. & S. W.	4	Cloudy till 9 A. M. Scatd. clouds afterwards; also drizzling at midnight & 1 A. M.; & between 3 & 4 P. M.
2	...	0.51	S. W. & S.	2¾	Scatd. clouds till 3 P. M. cloudy afterwards; also drizzling at 3 A. M. & from 6 to 10 P. M.; & thundering at 5 & 6 P. M.
3	...	3.60	W. & S. W.	4¼	Cloudy: also drizzling at 6 A. M. 2 & 3 P. M. & raining from 5 to 11 P. M.
4	...		S. W. & W. &. S.	4	Cloudy: also raining from midnight to 6 A. M. & at 2 P. M.
5	...	...	S. W. & S.	3	Cloudless till 5 A. M. cloudy afterwards; also drizzling at 1 & 3 P. M.
6	...	0.16	W. & S.	2¾	Cloudy; also drizzling at 1, 5 & 6 P. M.
7	...	0.20	*Sunday.*	5¼	
8	...	2.10	E. & S. E.	14½	Cloudy; also constantly raining.
9	...	2.26	S. & E.	3	Cloudy; also raining at 4, 5, 8 & 10 A. M. & between 9 & 10 P. M.
10	...	0.22	S. E & S. W.	3	Cloudy; also raining at 9 A. M. and from noon to 2 P. M. & at 6 P. M.
11	132.4	0.18	W. & N. W.	2¾	Cloudy till 5 A. M. Scatd. ⌒i till 8 P. M. cloudy afterwards; also raining at 3 & 4 A. M. & at 10 P. M.
12	...	0.88	N. & W.	9	Cloudy; also drizzling from 4 A. M. to 6 P. M. & thundering at 4 P. M.
13	...	0.18	E. & N. E. & S. E.	8¾	Cloudy; also drizzling after intervals.
14	...	2.62	*Sunday.*	7	
15	1150.	0.10	S. & E.	4¾	Cloudy till 5 A. M.; Scatd. ⌣i & ⌒i afterwards; also raining at 4 A. M. and at 2 P. M.
16	118.0	...	S.	3¼	Scatd. ⌣i & ⌒i till 4 A. M.; Scatd. \i & ⌣i till 1 P. M.; cloudy afterwards also thundering at 11 P. M.
17	124.0	...	S. & S. W.	3	Scatd. clouds till 5 P. M.: Scatd. ⌣i afterwards.
18	118.0	...	S. W. & S. & W.	4	Scatd. clouds.
19	...	0.28	S. & S. W.	4	Scatd. ⌣i till 3 A. M. cloudy afterwards; also raining at 5 A. M.
20	...	...	S. & W.	3¼	Cloudy; also drizzling from 3 to 8 P. M.; and thundering at 4 P. M.

\i Cirri,—i Strati, ⌒i Cumuli, ⌣i Cirro strati, ⌒i Cumulo strati, ⌣i Nimbi, ⌣ i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Guage 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
21	...	2.78	*Sunday.*	5	
22	123.0	...	S. W. & S. E. & S.	3	Cloudy till 9 A. M. Scatd. clouds till 7 P. M.; cloudless afterwards; also slightly drizzled at 1 A. M.
23	...	...	S. & variable.	3	Scatd. ⌣i till 8 A. M.: Scatd. clouds afterwards.
24	122.4	...	S. & W. & E.	3¼	Cloudless till 6 A. M.; Scatd ⌒i till 7 P. M.; cloudless afterwards also drizzling between 11 & noon.
25	126.0	0.15	S. & S. E.	3¼	Scatd. clouds till 7 P. M.; cloudless afterwards; also drizzling at 3 & 4 A. M.
26	136.2	...	S.	3¼	Scatd. \i & ⌣i till 10 A. M.; Scatd. ⌒i till 7 P. M.; cloudless afterwards.
27	129.0	...	S. & S. E.	3	Cloudless till 8 A. M.; Scatd. clouds till 8 P. M.; cloudless afterwards; also drizzling at 4 & 6 P. M.
28	...	...	*Sunday.*	3¼	
29	133.0	0.18	S. E. & S.	2¼	Scatd. ⌣i & ⌒i till 7 P. M.; cloudless afterwards; also raining at 6 P. M.
30	130.5	...	E. & S. & N.	3	Cloudless till 3 A. M.; Scatd. ⌣i & ⌒i afterwards.
31	...	0.24	E. & S. E.	5	Scatd. clouds till 11 A. M.; cloudy afterwards; also raining at noon & 1 A. M.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.621
Max. height of the Barometer occurred at 9 A. M. on the 29th, ..	29.810
Min. height of the Barometer occurred at 8 P. M. on the 13th, ..	29.269
Extreme range of the Barometer during the month, ...	0.541
Mean of the Daily Max. Pressures, ...	29.679
Ditto ditto Min. ditto, ...	29.557
Mean daily range of the Barometer during the month, ...	0.122

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	o
Mean Dry Bulb Thermometer for the month, ...	83.3
Max. Temperature occurred at 2, 3 & 4 P. M. on the 30th, ...	92.2
Min. Temperature occurred at Midnight on the 22nd, ...	77.0
Extreme range of the Temperature during the month, ...	15.2
Mean of the daily Max. Temperature, ...	87.6
Ditto ditto Min. ditto, ...	80.0
Mean daily range of the Temperature during the month, ...	7.6

Mean Wet Bulb Thermometer for the month, ...	79.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	3.5
Computed Mean Dew-point for the month, ...	77.3
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	6.0
	Inches
Mean Elastic force of Vapour for the month, ...	0.919

	Troy grains
Mean Weight of Vapour for the month, ...	9.86
Additional Weight of Vapour required for complete saturation, ..	2.07
Mean degree of humidity for the month, complete saturation being unity,	0.83

	Inches
Rained 24 days, Max. fall of rain during 24 hours, ...	3.60
Total amount of rain during the month, ...	16.64
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	17.35
Prevailing direction of the Wind, ...	S. & S. W.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of August, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
					No. of days.														
Midnight.					3		3		14	1	2		4	1					1
1					3	1	3		14	2	3		4	1					
2					3	1	4		12		3		3	1			1		1
3					3		4	1	11	1	2		4	1			1		3
4					4	1	3		8	1	4	1	3	1					5
5			1		3		3		9	1	4		6	2	1				
6			2		3	1	4		8		4		4	2	1	1			1
7	1		2		2	1	6		7		3		4		2	1			
8	1		1		2		5	1	4		8		3		3	1			
9	3	2	2	1	3		2		3		8	1	5		1				
10	2	1	2		3	2	3		4		10		2		1				
11	2	1			3		5		5	1	6		6						
Noon.	2	1	3		2	1	3	1	4		7	1	6						
1	2				4	2	2		7		6	1	6	2					
2	2	1			3	1	2		7	2	8	2	4	1	1				
3	1				7	2	1		6		7	1	4	2	1				
4	1	1			4	1	3	1	8	2	8		2		1				
5	1	1			3	1	4	1	9		3		3	3	2		1		1
6	2	2			1		8	4	9		2		4	3			1		
7	2	1			3	1	5	2	12		2		3	1					
8	2	1			3	1	6	1	12		1		3	1					
9	2	1			3		6		12		1		3	1					
10	1				2		4	1	14	1	3	1	3	2					
11	1				2		4	1	13		4		3	1					

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.678	29.731	29 626	0 105	82.8	88.4	79.8	8.6
2	.675	.729	.614	.115	83.2	87.4	79.8	7.6
3	.663	.715	.608	.107	84.1	89.2	80.8	8.4
4	*Sunday.*							
5	.655	.727	.553	.174	85.9	91.8	81.6	10.2
6	.590	.640	.511	.129	85.7	92.2	81.8	10.4
7	.572	.655	.500	.155	86.3	91.9	82.1	9.8
8	.571	.641	.507	.134	85.6	93.0	82.6	10.4
9	.504	.578	.420	.158	82.7	84.4	80.8	3.6
10	.441	.555	.341	.214	82.0	85.2	79.2	6.0
11	*Sunday.*							
12	.630	.681	.588	.093	83.9	87.3	81.2	6.1
13	.678	.731	.628	.103	85.0	91.2	80.8	10.4
14	.729	.801	.663	.138	84.6	90.8	81.0	9.8
15	.755	.821	.643	.178	85.4	90.6	81 8	8.8
16	.710	.774	.626	.148	83.6	88.0	81.0	7.0
17	.710	.783	.649	.134	81.9	87.0	78.8	8 2
18	*Sunday.*							
19	.665	.749	.576	.173	82.1	88.2	78.4	9.8
20	.605	.663	.527	.136	82.6	85.9	80.0	5 9
21	.614	.663	.576	.087	81.1	85.2	77.9	7.3
22	.634	.683	.588	.095	80.3	82.3	78.2	4.1
23	.677	.729	.610	.119	82.2	87.4	78.4	9.0
24	.746	.808	.694	.114	82.8	86.8	79.4	7.4
25	*Sunday.*							
26	.917	.983	.860	.123	83.3	89.3	79.6	9.7
27	.882	.956	.805	.151	84.4	89.8	80.0	9.8
28	.828	.899	.744	.155	85.8	90.8	81.4	9.4
29	.817	.871	.754	.117	84.8	91.8	81.8	10.0
30	.833	.898	.767	.131	85.8	90.8	81.2	9.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued).*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	79 2	3.6	76.7	6.1	0.902	9.68	2.07	0.82
2	79 6	3.6	77.1	6.1	.913	.80	.09	.82
3	80.4	3.7	77.8	6.3	.934	10.01	.20	.82
4	*Sunday.*							
5	81.3	4.6	78.1	7.8	.943	.06	.81	.78
6	81.4	4.3	78.4	7.3	.952	.17	.63	.80
7	81.4	4.9	78.0	8.3	.940	.03	.99	.77
8	81.4	4.2	78.5	7.1	.955	.21	.55	.80
9	80.4	2.3	78.8	3.9	.964	.36	1.36	.88
10	79.1	2.9	77.1	4.9	.913	9.82	.65	.86
11	*Sunday.*							
12	80.2	3.7	77.6	6.3	.928	.95	2.18	.82
13	80.9	4.1	78 0	7.0	.940	10.05	.48	.80
14	80.1	4.5	76.9	7.7	.908	9.70	.69	.78
15	80.6	4.8	77.2	8.2	.916	.79	.89	.77
16	80.3	3.3	78.0	5.6	.940	10.07	1.96	.84
17	79.2	2.7	77.3	4.6	.919	9.88	.56	.86
18	*Sunday.*							
19	79 4	2.7	77.5	4.6	.925	.94	.57	.86
20	79.9	2.7	78.0	4.6	.940	10.09	.59	.86
21	78.9	2.2	77.4	3.7	.922	9.93	.24	.89
22	78.2	2.1	76.7	3.6	.902	.72	.19	.89
23	78.7	3.5	76.2	6 0	.887	.54	2.00	.83
24	79.2	3.6	76 7	6.1	.902	.68	.07	.82
25	*Sunday.*							
26	79.4	3.9	76 7	6.6	.902	.66	.27	.81
27	80.3	4.1	77.4	7.0	.922	.87	.44	.80
28	81.2	4.6	78.0	7.8	.940	10 03	2.80	.78
29	80.7	4.1	77.8	7.0	.934	9.99	.47	.80
30	80.1	5.7	76.1	9.7	.885	.44	3.39	.74

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.692	29.916	29.446	0.470	81.8	84.4	78.7	5.7
1	.684	.905	.402	.503	81.6	84.2	78.4	5.8
2	.674	.891	.388	.503	81.4	83.8	78.6	5.2
3	.656	.886	.368	.518	81.3	83.6	78.5	5.1
4	.666	.892	.341	.551	81.2	83.1	78.6	4.5
5	.678	.908	.345	.563	80.8	83.2	77.9	5.3
6	.688	.930	.368	.562	80.7	82.6	78.4	4.2
7	.708	.945	.381	.564	81.5	83.8	79.2	4.6
8	.726	.974	.422	.552	83.1	86.2	79.3	6.9
9	.737	.982	.442	.540	84.3	87.2	80.8	6.4
10	.740	.983	.459	.524	85.6	88.8	80.5	8 3
11	.727	.967	.473	.494	86.5	89.8	81.8	8.0
Noon.	.707	.952	.461	.491	87.1	91.4	80.6	10.8
1	.681	.918	.445	.473	87.6	93.0	82.0	11.0
2	.654	.883	.433	.450	87.4	92.2	79.0	13.2
3	.634	.866	.427	.439	86.8	91.9	78.8	13.1
4	.622	.860	.420	.440	86.4	91.6	79.0	12.6
5	.629	.866	.434	.432	85.4	89.5	80.2	9.3
6	.642	.878	.427	.451	84.4	88.0	80.2	7.8
7	.658	.893	.449	.444	83.7	87.2	79.8	7.4
8	.682	.911	.462	.449	83.2	86.2	79.6	6.6
9	.702	.925	.480	.445	82.8	85.3	79.8	5 5
10	.712	.933	.482	.451	82.6	84.8	79.6	5.2
11	.707	.943	.465	.478	82.2	84.4	79.6	4.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	79.6	2.2	78.1	3.7	0.943	10.14	1.26	0.89
1	79.4	2.2	77.9	3 7	.937	.08	.26	.89
2	79.3	2.1	77.8	3.6	.934	.05	.22	.89
3	79.4	1.9	78.1	3.2	.943	.16	.08	.90
4	79.3	1.9	78.0	3.2	.940	.13	.08	.90
5	78.9	1.9	77.6	3.2	.928	.01	.06	.90
6	78.8	1.9	77.5	3.2	.925	9.98	.06	.90
7	79.2	2.3	77.6	3.9	.928	.99	.32	.88
8	79.8	3.3	77.5	5.6	.925	.92	.94	.84
9	80.2	4 1	77.3	7.0	.919	.84	2.44	.80
10	80.5	5.1	76.9	8.7	.908	.68	3.08	.76
11	80.9	5.6	77.5	9.0	.925	.86	.24	.75
Noon.	81.1	6.0	77.5	9.6	.925	.84	.49	.74
1	81.1	6.5	77.2	10.4	.916	.75	.77	.72
2	81.0	6.4	77.2	10.2	.916	.75	.70	.73
3	80.7	6.1	77.0	9.8	.910	.69	.52	.73
4	80.6	5.8	76.5	9.9	896	.56	.50	.73
5	80.5	4.9	77.1	8.3	.913	.76	2.92	.77
6	80.4	4.0	77.6	6.8	.928	.93	.38	.81
7	80.3	3.4	77.9	5.8	.937	10.04	.03	.83
8	80.1	3.1	77.9	5.3	.937	.06	1.83	.85
9	79.9	2.9	77.9	4.9	.937	.16	.69	.86
10	79.9	2.7	78.0	4.6	.940	.09	.59	.86
11	79.8	2.4	78.1	4.1	.943	.14	.40	.88

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
1	114.0	0.12	E. & S. E. & S.	5¾	Scatd. clouds; also drizzling between 10 & 11 A. M.; at 1 and between 3 & 4 P. M.
2	...	0.12	S. E.	5½	Scatd. clouds till 7 P. M. cloudless afterwards; also slightly raining at 11 A. M. & between 3 & 4 P. M.
3	126.0	...	S. E. & S.	4	Scatd. clouds till 8 P. M.: cloudless afterwards; also very slightly drizzled at 8 A. M.
4	...	...	*Sunday.*	2¾	
5	135.0	...	S. & S. E.	3¼	Cloudless till 5 A. M.; Scatd. ⌙i & ⌒i afterwards.
6	138.0	...	S. & S. E.	2½	Scatd. ⌙i & ⌒i till 7 P. M.; cloudless afterwards.
7	139.0	...	S. & S. E.	3¼	Scatd. clouds till 7 A. M.; Scatd. ⌙i & ⌒i till 8 P. M. cloudless afterwards.
8	132.8	0.13	S. & N. W. & N. E.	4	Cloudless till 5 A. M.; Scatd \i till 8 A. M.; Scatd. ⌒i till 1 P. M. cloudy afterwards; also thundering and drizzling at 3 P. M.
9	...	1.79	N. & N. W. & N. E.	3	Cloudless till 5 A. M. cloudy afterwards; also raining occasionally after 9 A. M.
10	...	0.91	S. & N.	6¼	Cloudy till noon Scatd. clouds till 6 P. M.; Scatd. ⌙i afterwards; also raining from midnight to 10 A. M.; and drizzling at 3 P. M.
11	...	0.25	*Sunday.*	3	
12	120.0	...	S. & S. W. & Calm.	2½	Scatd. clouds till 7 A. M.; cloudy till 3 P. M. Scatd. \i & ⌙i afterwards.
13	137.0	...	S. & S. E.	3	Scatd. ⌙i & ⌒i.
14	144.0	...	S. E. & S.	4½	Scatd. \i & ⌙i till 10 A. M; Scatd. ⌙i & ⌒i till 6 P. M.; Scatd. \i & ⌙i afterwards.
15	139.0	...	S. E. & S.	2¾	Scatd. ⌙i till 8 A. M.; Scatd. clouds afterwards.
16	...	0.10	S.	3	Scatd. ⌙i & ⌒i till 8 A. M.; cloudy afterwards; also raining between 11 & noon & thundering at 1 P. M.
17	...	0.33	S. & N. E. & S. E.	2¾	Cloudy; also raining from 2 to 5 P. M. and at 10 & 11 P. M. & thundering at 7 A. M & 2 P. M.
18	...	0.82	*Sunday.*	4	

\i Cirri,—i Strati, ⌒i Cumuli, ⌙i Cirro strati, ⌒i Cumulo strati, ⌙i Nimbi, ⌙i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
19	...	0.37	S. E.	3	Cloudy: also raining from 5 to 9 A. M. and between 2 & 3 P. M.
20	...	...	S. & E.	2½	Cloudy; also drizzling at 5 & 6 A. M.
21	...	2.34	N. & N. W.	3¼	Cloudy; also raining from 4 to 6 A. M. & drizzling incessantly from noon to 11 P. M
22	...	*4.97	S. W. & N.	2¾	Cloudy; also raining nearly the whole day.
23	133.0	0.20	S. W. & W.	3	Cloudy till 10 A. M. Scatd. ⌣i & ⌢i afterwards; also raining at 4 A. M. and at 10 & 11 P. M.
24	125.4	...	W.	3	Cloudy till 8 A. M. Scatd. clouds till 7 P. M.; cloudless afterwards.
25	...	...	*Sunday.*	3¼	
26	140.8	...	S. E. & S.	3¼	Cloudless till 4 A. M.; Scatd. clouds afterwards; also slightly drizzled at 4 P. M.
27	133.0	...	S. & W.	3	Cloudless till 7 A. M.; Scatd. ⌢i till 4 P. M.; cloudless afterwards.
28	144.0	...	W. & S. W.	3	Cloudless till 7 A. M.; Scatd. ⌢i till 6 P. M.; cloudless afterwards.
29	140.0	0.14	W. & S. & S. E.	3¼	Cloudless till 7 A. M.; Scatd. clouds till 7 P. M.; cloudless afterwards, also raining at noon & 3 P. M.
30	139.8	...	N. W. & E.	2½	Scatd. clouds till 8 A. M.; Scatd. ⌣i & ⌢i till 7 P. M.: cloudless afterwards.

* From noon of the 21st to 9 P. M. of the 22nd.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.684
Max. height of the Barometer occurred at 10 A. M. on the 26th, ..	29.983
Min. height of the Barometer occurred at 4 A. M. on the 10th, ..	29.341
Extreme range of the Barometer during the month, ...	0.642
Mean of the Daily Max. Pressures,..	29.749
Ditto ditto Min. ditto, ...	29.615
Mean daily range of the Barometer during the month, ...	0.134

	o
Mean Dry Bulb Thermometer for the month, ...	83.8
Max. Temperature occurred at 1 P. M. on the 8th, ...	93.0
Min. Temperature occurred at 5 A. M. on the 21st, ...	77.9
Extreme range of the Temperature during the month, ...	15.1
Mean of the daily Max. Temperature, ...	88.7
Ditto ditto Min. ditto, ...	80.4
Mean daily range of the Temperature during the month, ...	8.3

Mean Wet Bulb Thermometer for the month, ...	80.1
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	3.7
Computed Mean Dew-point for the month, ...	77.5
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	6.3
	Inches
Mean Elastic force of Vapour for the month, ...	0.925

	Troy grains
Mean Weight of Vapour for the month, ...	9.92
Additional Weight of Vapour required for complete saturation, ..	2.18
Mean degree of humidity for the month, complete saturation being unity,	0.82

	Inches
Rained 17 days, Max. fall of rain during 24 hours, ...	2.34
Total amount of rain during the month, ...	12.59
Total amount of rain indicated by the gauge attached to the Anemometer during the month, ...	11.54
Prevailing direction of the Wind, ...	S. & S. E.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of September, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	2	2			2		7		8		1		3		1		1		1
1	2	2			2		7		8		1		3		2		1		
2	2	2			3		5		8		1		3		2		1		1
3	2	2			4		5		8		1		2		2		1		1
4	1	1	1		3	1	5		7		2	1	2		2		1		2
5	2	2	1	1	3	2	4		7		2		2		2				3
6	2	1			3	1	5	1	9		1	1	5	1	1				
7	2	1	1		3	1	6		9		1	1	2		2				
8			1		1		7	2	7		3		3		4				
9	1		1				6		9	1	2		5	1	2				
10			2	1	2		6		7	1	2	1	6		1				
11	1		1	1	2	1	6		6	1	4		4		2				
Noon.	2	2	1		1		6		7		3	2	6	1					
1	2		1		2		6		3		7	2	4		1				
2	3		3		3	2	7	1	4		5	1	1						
3	2	2	1	1	5	1	4	1	6	1	4	1	2		2				
4	1				1	1	2	1	9	2	7	1	4		2	1			
5	1				1		6		8		3		4		3	2			
6	2	2	1		2		4		10		3		3		1				
7	2	2	1		1		5		10		3	1	3		1				
8	2	1	2		1		5		10		3	1	3						
9	2	2	2		1		6		10		2	1	3						
10	2		1	1			6		10		2	1	3		1				1
11	1		1	1			7		10		2	1	3		2	1			

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11. Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.836	29.901	29.776	0.125	84.9	89.8	82.2	7.6
2	*Sunday.*							
3	.809	.866	.745	.121	84.4	90.8	78.2	12.6
4	.797	.866	.734	.132	79.5	83.0	77.0	6.0
5	.450	.719	28.681	1.038	76.3	78.2	74.4	3.8
6	.803	.871	29.712	0.159	80.0	85.2	75.8	9.4
7	.839	.891	.771	.120	81.7	87.8	77.4	10.4
8	.849	.906	.791	.115	82.4	89.4	77.4	12.0
9	*Sunday.*							
10	.859	.906	.807	.099	78.5	81.3	77.4	3.9
11	.874	.939	.813	.126	80.8	86.6	77.0	9.6
12	.862	.915	.794	.121	81.6	86.0	77.4	8.6
13	.863	.919	.811	.108	80.9	85.8	77.0	8.8
14	.912	.966	.851	.115	81.0	86.8	76.4	10.4
15	.931	.991	.884	.107	81.1	86.6	76.0	10.6
16	*Sunday.*							
17	.934	30.000	.890	.110	82.1	87.0	78.0	9.0
18	.946	.007	.893	.114	82.0	87.5	76.0	11.5
19	.923	29.994	.854	.140	82.5	88.3	76.8	11.5
20	.877	.906	.822	.084	80.3	85.2	74.1	11.1
21	.869	.928	.820	.108	71.9	75.2	69.1	6.1
22	.779	.832	.728	.104	74.1	75.8	72.2	3.6
23	*Sunday.*							
24	.810	.872	.768	.104	81.1	88.0	75.0	13.0
25	.859	.926	.799	.127	81.9	90.4	75.0	15.4
26	.936	30.019	.872	.147	81.2	89.8	74.8	15.0
27	.949	.007	.901	.106	80.4	88.2	72.8	15.4
28	.956	.032	.902	.130	79.1	86.5	72.5	14.0
29	.978	.062	.932	.130	78.0	85.0	70.6	14.4
30	*Sunday.*							
31	.983	.057	.935	.122	80.1	86.8	74.2	12.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means, are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	80.3	4.6	77.1	7.8	0.913	9.76	2.73	0.78
2	*Sunday.*							
3	78.5	5.9	74.4	10.0	.838	8.97	3.34	.73
4	76.1	3.4	73.7	5.8	.819	.85	1.81	.83
5	74.3	2.0	72.9	3.4	.797	.68	.01	.90
6	75.8	4.2	72.9	7.1	.797	.61	2.20	.80
7	77.4	4.3	74.4	7.3	.838	9.02	.35	.79
8	77.7	4.7	74.4	8.0	.838	.00	.61	.78
9	*Sunday.*							
10	76.3	2.2	74.8	3.7	.849	.19	1.16	.89
11	76.9	3.9	74.2	6.6	.832	8.96	2.11	.81
12	77.0	4.6	73.8	7.8	.822	.84	.50	.78
13	76.2	4.7	72.9	8.0	.797	.59	.51	.77
14	75.8	5.2	72.2	8.8	.781	.40	.74	.75
15	75.3	5.8	71.2	9.9	.756	.13	3.04	.73
16	*Sunday.*							
17	75.7	6.4	71.2	10.9	.756	.12	.39	.71
18	75.4	6.6	70.8	11.2	.746	.02	.45	.70
19	76.2	6.3	71.8	10 7	.771	.26	.38	.71
20	75.4	4.9	72.0	8.3	.776	.36	2.55	.77
21	69.0	2.9	66.7	5.2	.653	7.16	1.32	.84
22	72.0	2.1	70.5	3.6	.739	8.06	.01	.89
23	*Sunday.*							
24	75.4	5.7	71.4	9.7	.761	.18	2.99	.73
25	74.1	7.8	68.6	13.3	.695	7.47	3.97	.65
26	72.4	8.8	66.2	15.0	.642	6.91	4.30	.62
27	72.3	8.1	66.6	13.8	.651	7.01	3.93	.64
28	70.6	8.5	64.6	14.5	.609	6.58	.95	.63
29	70.6	7.4	65.4	12.6	.626	.77	.42	.66
30	*Sunday.*							
31	73.6	6.5	69.0	11.1	.704	7.59	.25	.70

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.874	29.993	29.712	0.281	78.0	83.8	72.2	11.6
1	.865	.981	.694	.287	77.6	83.8	72.4	11.4
2	.853	.971	.656	.315	77.4	83.4	72.6	10.8
3	.848	.971	.641	.330	76.7	83.4	72.2	11.2
4	.846	.972	.616	.356	76.6	83.0	71.6	11.4
5	.857	.987	.605	.382	76.7	82.6	70.6	12.0
6	.874	30.008	.601	.407	76.2	82.4	69.1	13 3
7	.893	.025	.588	.437	77.1	83.8	70.2	13.6
8	.925	.052	.763	.289	79.5	85.7	70.4	15.3
9	.924	.062	.554	.508	81.2	87.4	69.8	17.6
10	.920	.045	.475	.570	82.6	87.4	70.3	17.1
11	.896	.027	.333	.694	83.8	89.0	71.8	17.2
Noon.	.865	29.999	.113	.886	84.3	88.9	72.5	16.4
1	.832	.972	28.850	1.122	84.7	90.0	72.4	17.6
2	.801	.953	.681	.272	84.8	90.8	72.4	18.4
3	.799	.937	.930	.007	85.0	90.4	72.4	18.0
4	.801	.935	29.014	0.921	84.5	90.6	71.6	19.0
5	.842	.941	.753	.188	83.4	88.6	71.4	17.2
6	.840	.954	.539	.415	81.3	86.8	71.4	15.4
7	.861	.962	.544	.418	80.2	84.5	71.4	13.1
8	.882	.977	.622	.355	79 3	82.6	71.4	11.2
9	.894	.993	.686	.307	79.0	82.6	72.0	10.6
10	.897	.989	.716	.273	78.5	82.2	72.2	10.0
11	.890	.979	.719	.260	78.1	82.2	72.2	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	74.7	3.3	72.4	5.6	0.785	8.50	1.69	0.83
1	74.7	2.9	72.7	4.9	.792	.59	.48	.85
2	74.5	2.9	72.5	4.9	.787	.54	.47	.85
3	74.0	2.7	72.1	4.6	.778	.44	.36	.86
4	74.0	2.6	72.2	4.4	.781	.48	.29	.87
5	74.2	2.5	72.4	4.3	.785	.53	.27	.87
6	73.7	2.5	71.9	4.3	.773	.41	.25	.87
7	74.3	2.8	72.3	4.8	.783	.49	.43	.86
8	74.9	4.6	71.7	7.8	.768	.30	2.36	.78
9	75.2	6.0	71.0	10.2	.751	.09	3.12	.72
10	75.5	7.1	70.5	12.1	.739	7.93	.75	.68
11	75.8	8.0	70.2	13.6	.732	.82	4.28	.65
Noon.	75.7	8.6	69.7	14.6	.720	.69	.59	.63
1	75.5	9.2	69.1	15.6	.706	.53	.89	.61
2	75.6	9.2	69.2	15.6	.708	.56	.90	.61
3	75.6	9.4	69.0	16.0	.704	.51	5.02	.60
4	75.4	9.1	69.0	15.5	704	.51	4.84	.61
5	75.5	7.9	70.0	13.4	.727	.79	.17	.65
6	75.5	5.8	71.4	9.9	.761	8.18	3.06	.73
7	75.4	4.8	72.0	8.2	.776	.36	2.52	.77
8	75.2	4.1	72.3	7.0	.783	.46	.13	.80
9	75.2	3.8	72.5	6.5	.787	.51	1.99	.81
10	75.1	3.4	72.7	5.8	.792	.58	.77	.83
11	74.8	3.3	72.5	5.6	.787	.53	.69	.84

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches.		lbs	
1	134.0	0.12	S. & S. E.	4¼	Cloudless till 5 A. M. Scatd. clouds till 6 P. M. cloudless afterwards, also raining between 1 & 2 P. M.
2	...	...	*Sunday.*	3	
3	144.0	1.57	N. & N. W. & E.	6½	Cloudless till 10 A. M. ⌒i till 5 P. M. cloudy afterwards; also thundering and raining at 7 & 8 P. M.
4	...	0.20	E. & S.	..	Cloudy; also drizzling at noon & 1 P. M. & from 5 to 11 P. M.
5	...	*1.55	E. (vanes broken.)	...	Heavy scud also heavy driving rain. From midnight to 6 P. M. a Cyclone passed over Calcutta.
6	140.0	...	...	...	Cloudy till 6 A. M. ⌣i & ⌒i till 5 P. M. cloudless afterwards.
7	142.8	...	...	...	Cloudless till 4 A. M. ⌣i & ⌒i afterwards.
8	132.5	1.59	...	...	Scatd. clouds till 4 P. M. cloudy afterwards; also raining between 5 & 6 P. M.
9	...	...	*Sunday.*	...	
10	...	0.87	E.	...	Cloudy; also raining after intervals.
11	132.2	...	S. & S. E. & N. E.	...	⌣i till 3 A. M. Scatd. clouds till 1 P. M. ⌒i till 6 P. M. cloudless afterwards.
12	143.0	...	S. & N. E.	...	Cloudless till 7 A. M. ⌣i & ⌒i afterwards.
13	125.0	...	Variable.	...	Cloudless till 4 A. M. ⌒i afterwards.
14	126.0	...	S. E. & N.	...	\i & ⌣i till 9 A. M. ⌒i afterwards.
15	135.0	...	N.	...	⌣i till 10 A. M. ⌣i & ⌒i till 6 P. M. cloudless afterwards also slightly foggy from 9 to 11 P. M.
16	...	...	*Sunday.*	...	
17	136.4	...	N.	...	Cloudless till 10 A. M. ⌒i till 4 P. M. cloudless afterwards.
18	146.2	...	N. & S. E.	...	⌣i till 7 A. M. ⌒i till 4 P. M. cloudless afterwards.
19	145.4	...	N. & S. E. & N. W.	...	\i till 5 A. M. ⌣i till 10 A. M. ⌒i till 5 P. M. \i & ⌣i afterwards.
20	...	0.16	N. W. & E. & S. E.	...	Cloudy; also drizzling from 1 to 11 P. M.
21	...	0.16	N. E. & E.	...	Cloudy; also drizzling nearly the whole day.

* By gauge attached to the Anemometer.

\i Cirri,—i Strati, ⌒i Cumuli, ⌣i Cirro strati, ⌒i Cumulo strati, ⌣i Nimbi ⌣i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5 feet above Ground.	Prevailing direction of the Wind.	M. Pressure of Wind.	General Aspect of the Sky.
	o	Inches		lbs	
22	...	0.28	N. & N. W.	...	Cloudy till 8 P. M. cloudless afterwards also drizzling after intervals till 4 P. M.
23	...	...	*Sunday.*	...	
24	142.5	...	S. W. & S. & W. & N.	...	Cloudless.
25	148.2	...	S. W. & N. W.	...	Cloudless.
26	148.0	...	W. & N. W.	...	Cloudless.
27	144.2	...	N. W. & W. & N.	...	Cloudless.
28	145.0	...	N. & N. W.	...	Cloudless.
29	142.8	...	N. & N. W.	...	Cloudless.
30	...	...	*Sunday.*	...	
31	147.0	...	E. & N.	...	Cloudless till 4 A. M. cloudy till 10 A. M. ⌐i afterwards.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of October, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	29.866
Max. height of the Barometer occurred at 9 A. M. on the 29th, ..	30.062
Min. height of the Barometer occurred at 2 P. M. on the 5th, ..	28.681
Extreme range of the Barometer during the month, ...	1.381
Mean of the Daily Max. Pressures, ...	29.935
Ditto ditto Min. ditto, ...	29.780
Mean daily range of the Barometer during the month, ...	0.155

	°
Mean Dry Bulb Thermometer for the month, ...	80.3
Max. Temperature occurred at 2 P. M. on the 3rd, ...	90.8
Min. Temperature occurred at 6 A. M. on the 21st, ...	69.1
Extreme range of the Temperature during the month, ...	21.7
Mean of the daily Max. Temperature, ...	85.8
Ditto ditto Min. ditto, ...	75.6
Mean daily range of the Temperature during the month, ...	10.2

Mean Wet Bulb Thermometer for the month, ...	75.0
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	5.3
Computed Mean Dew-point for the month, ...	71.3
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	9.0
	Inches
Mean Elastic force of Vapour for the month, ...	0.758

	Troy grains
Mean Weight of Vapour for the month, ...	8.18
Additional Weight of Vapour required for complete saturation, ..	2.73
Mean degree of humidity for the month, complete saturation being unity,	0.75

	Inches
Rained 9 days, Max. fall of rain during 24 hours, ...	1.59
Total amount of rain during the month, ...	6.50
Prevailing direction of the Wind, ...	N. & E.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	7		5		2		2		4		1				3				2
1	9		5		1		3		4		1				3				
2	8		4		2		3		3		1				4				1
3	10		4				3		2						5				2
4	12		1		1		1		3	1					4				4
5	12		4				1		2						3				4
6	12	1	2		2		1		3				1		5				
7	12	1	1		3		4		1						5				
8	7		4		4		3	1	1		2				5				
9	6		6		5		2		1		1				5				
10	10		7		1		3		1		1		1		2				
11	9		6		2		2	1	2		1		1		3				
Noon.	11		3		3	1	4				1		2		2				
1	11	1	2		3		2		2	1	1		1		4				
2	16				1		3		2				1		3				
3	12		5				3	1	1		1				4				
4	12		3		1		4		1		1				4				
5	10		4		2	1	3		2	1	1		1		3				
6	7		5		4	1	2		1	1	2				5				
7	7		5		2		3		1		2				5		1		
8	7		5		2		2		2		2				5		1		
9	7		4		2		3		2		2				5		1		
10	7		5		2		2		2		2				5		1		
11	7		5		2		2		2		2				5		1		

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of November, 1864.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Height of the Cistern of the Standard Barometer above the Sea-level, 18.11 Feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.998	30.063	29.939	0.124	82.4	88.4	78.6	9.8
2	30.009	.076	.956	.120	83.1	89.2	78.0	11.2
3	.041	.107	.980	.127	81.1	86.5	76.8	9.7
4	.044	.102	.984	.118	80.0	85.2	76.8	8.4
5	.044	.119	.985	.134	77.4	83.3	74.2	9.1
6	*Sunday.*							
7	29.975	.050	.886	.164	79.8	85.4	74.4	11.0
8	.978	.049	.927	.122	76.8	80.9	71.8	9.1
9	30.055	.132	30.006	.126	76.7	83.0	72.4	10.6
10	.108	.178	.067	.111	75.3	82 3	71.4	10.9
11	.120	.205	.057	.148	76.0	82.0	71.0	11.0
12	.071	.145	.004	.141	76.1	82.6	71.2	11.4
13	*Sunday.*							
14	.034	.109	29.963	.146	75.0	81.0	70.0	11.0
15	29.996	.068	.930	.138	74 9	81.4	69.8	11.6
16	30.001	.074	.955	.119	74.4	81.5	67.6	13.9
17	.022	.088	.978	.110	74.1	81.2	67.8	13.4
18	.022	.094	.961	.133	74.2	81.6	67.4	14.2
19	.029	.098	.976	.122	75.0	81.4	68.2	13.2
20	*Sunday.*							
21	.022	.104	.959	.145	73.0	80.4	66.4	14.0
22	.030	.104	.984	.120	71.6	80.2	63.9	16.3
23	.036	.124	.980	.144	70.4	78.6	62.6	16.0
24	.015	.087	.959	.128	70.9	79.3	62.8	16.5
25	.008	.088	.955	.133	71.9	79.6	64.8	14.8
26	.018	.077	.973	.104	71.7	80.2	63.9	16.3
27	*Sunday.*							
28	.087	.159	30.035	.124	75.5	83.4	69.8	13.6
29	.070	.144	.004	.140	74.8	82 6	67.4	15.2
30	.039	.110	29.981	.129	73.9	81.0	66.8	14.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the hourly Observations made during the day.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Daily Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued)*.

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	67.1	6.6	62.5	11.2	0.568	6.21	2.75	0.69
2	66.5	6.2	61.5	11.2	.550	.02	.66	.69
3	62.6	8.0	56.2	14.4	.461	5.06	3.09	.62
4	*Sunday.*							
5	63.7	7.0	58.1	12.6	.491	.39	2.79	.66
6	63.7	6.6	58.4	11.9	.496	.45	.63	.68
7	64.5	6.5	59.3	11.7	.511	.60	.65	.68
8	63.4	7.2	57.6	13.0	.483	.30	.85	.65
9	62.8	6.9	57.3	12.4	.478	.26	.67	.66
10	63.8	7.3	58.0	13.1	.489	.37	.91	.65
11	*Sunday.*							
12	65.1	6.4	60.0	11.5	.523	.73	.65	.68
13	65.5	6.3	60.5	11.3	.532	.84	.61	.69
14	65.9	5.8	61.3	10.4	.546	6.00	.43	.71
15	65.0	6.5	59.8	11.7	.520	5.69	.69	.68
16	66.6	6.3	61.6	11.3	.552	6.03	.70	.69
17	66.4	6.7	61.0	12.1	.541	5.91	.88	.67
18	*Sunday.*							
19	66.4	6.6	61.1	11.9	.543	.93	.83	.68
20	65.8	7.5	59.8	13.5	.520	.67	3.17	.64
21	63.6	7.9	57.3	14.2	.478	.24	.14	.63
22	62.3	7.4	56.4	13.3	.464	.10	2.83	.64
23	60.9	7.3	55.1	13.1	.444	4 91	.67	.65
24	62.5	7.6	56.4	13.7	.464	5.09	.94	.63
25	*Sunday.*							
26	62.2	7.0	56.6	12.6	.467	.14	.67	.66
27	61.7	7.4	55.8	13.3	.455	.02	.76	.65
28	57.9	7.9	51.6	14.2	.394	4.37	.67	.62
29	56.9	7.7	50.7	13.9	.382	.26	.52	.63
30	58.7	6.5	53.5	11.7	.421	.68	.23	.68
31	59.8	6.4	54.7	11.5	.438	.85	.27	.68

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	30.026	30.112	29.953	0.159	66.5	70.4	60.0	10.4
1	.024	.103	.943	.160	65.8	69.9	59.4	10.5
2	.016	.103	.938	.165	65.3	69.8	58.6	11.2
3	.004	.086	.940	.146	64.8	69.6	57.9	11.7
4	.009	.098	.934	.164	64.0	68.8	57.4	11.4
5	.023	.105	.940	.165	63.7	68.4	56.6	11.8
6	.039	.122	.949	.173	63.0	68.0	56.2	11.8
7	.062	.146	.974	.172	63.0	67.8	56.4	11.4
8	.088	.171	30.002	.169	66.3	70.4	59.4	11.0
9	.111	.191	.027	.164	70.0	74.1	64.8	9.3
10	.108	.186	.027	.159	73.2	76.4	68.0	8.4
11	.088	.176	.005	.171	75.5	78.0	70.8	7.2
Noon.	.057	.145	29.969	.176	77.3	80.8	72.8	8.0
1	.024	.115	.930	.185	78.4	81.8	74.0	7.8
2	.001	.101	.904	.197	79.3	82.8	74.4	8.4
3	29.989	.096	.898	.198	79.0	83.0	74.4	8.6
4	.985	.094	.901	.193	77.2	81.0	72.2	8.8
5	.993	.095	.906	.189	75.4	79.2	70.4	8.8
6	30.008	.119	.916	.203	73.2	77.0	68.0	9.0
7	.024	.141	.933	.208	71.2	75.1	65.4	9.7
8	.038	.153	.949	.204	69.7	73.2	63.9	9.3
9	.047	.160	.967	.193	68.7	72.4	63.0	9.4
10	.049	.146	.967	.179	67.8	71.6	62.4	9.2
11	.040	.140	.960	.180	66.9	71.2	60.2	11.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the Observations made at the several hours during the month.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.—*(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	Troy grs.	Troy grs.	
Mid-night.	62.6	3.9	59.5	7.0	0.515	5.70	1.49	0.79
1	62.0	3.8	59.0	6.8	.506	.61	.43	.80
2	61.7	3.6	58.8	6.5	.503	.57	.36	.80
3	61.3	3.5	58.5	6.3	.498	.53	.30	.81
4	60.5	3.5	57.3	6.7	.478	.31	.34	.80
5	60.3	3.4	57.2	6.5	.476	.29	.30	.80
6	59.7	3.3	56.7	6.3	.469	.23	.22	.81
7	59.7	3.3	56.7	6.3	.469	.23	.22	.81
8	61.4	4.9	57.5	8.8	.481	.33	.82	.75
9	63.0	7.0	57.4	12.6	.480	.27	2.73	.66
10	64.5	8 7	57.5	15.7	.481	.26	3.56	.60
11	65.2	10.3	58.0	17.5	.489	.31	4.15	.56
Noon.	65.5	11.8	57 2	20.1	.476	.16	.82	.52
1	66.0	12.4	57.3	21.1	.478	.16	5.15	.50
2	66 2	13.1	57.0	22.3	.473	.11	.48	.48
3	65.7	13.3	56.4	22.6	.464	.00	.50	.48
4	65.0	12.2	56.5	20.7	465	.04	4.91	.51
5	65.4	10.0	58.4	17.0	.496	.39	.04	.57
6	65.6	7.6	59.5	13.7	.515	.62	3.20	.64
7	65.2	6.0	60.4	10.8	.530	.82	2.48	.70
8	64.4	5.3	60.2	9.5	.527	.79	.14	.73
9	63.6	5.1	59.5	9.2	.515	.68	.01	.74
10	63.1	4.7	59.3	8.5	.511	.64	1.84	.75
11	62.7	4.2	59.3	7.6	.511	.65	.63	.78

All the Hygrometrical elements are computed by the Greenwich Constants.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 5feet above Ground.	Prevailing direction of the Wind.	General Aspect of the Sky.
	o	Inches.		
1	137.4	...	N. W. & N. E.	Cloudless till 5 A. M. \i till 7 P. M. cloudless afterwards also slightly foggy at midnight.
2	137.0	...	N. W.	Cloudless till 5 A. M. Scatd. clouds till 6 P. M. cloudless afterwards also slightly foggy at 8 A. M.
3	140.5	...	N. W. & N.	Cloudless : also slightly foggy at 6 A. M.
4	...	...	*Sunday.*	
5	141.0	...	N.	Cloudless.
6	139.0	...	N.	Cloudless.
7	139.0	...	N.	Cloudless till 5 A. M. _i till 11 A. M. \i till 6 P. M. cloudless afterwards.
8	140.2	...	N. & N. W. & W.	Cloudless.
9	135.9	...	W. & S. & N.	Cloudless : also slightly foggy at 1 A. M. & from 9 to 11 P. M.
10	138.0	...	N. W. & S.	Cloudless also slightly foggy from midnight to 3 A. M. & at 8 & 9 P. M.
11	...	...	*Sunday.*	
12	129.4	...	N. W.	_i till 6 A. M. \i till noon _i & \i till 6 P. M. cloudless afterwards.
13	137.0	...	N. W. & N.	Cloudless : also slightly foggy at 10 & 11 P. M.
14	134.8	...	N. & S. W.	Cloudless, also slightly foggy at midnight & 1 A. M.
15	142.0	...	W. & S. & S. W.	Cloudless : also slightly foggy at 8 & 9 P. M.
16	144.5	...	S. & S. W.	Cloudless.
17	144.0	...	W.	Cloudless.
18	..	...	*Sunday.*	
19	140.0	...	S. W. & S.	Cloudless : also slightly foggy at 6 A. M.
20	141.5	...	W. & N. W. & N.	Cloudless till 2 A. M. _i till 9 A. M. cloudless afterwards.
21	138.4	...	N. W. & N.	_i till 2 P. M. cloudless afterwards also slightly foggy from midnight to 2 A. M.
22	139.0	...	N. & N. W.	Cloudless.
23	139.5	...	N. & E.	Cloudless.
24	141.4	...	N. & N. E. & E.	Cloudless.
25	...	...	*Sunday.*	
26	138.2	...	W. & N.	Cloudless : also slightly foggy at 6 & 7 A. M.
27	146.0	...	N. & N. W.	Cloudless.
28	135.0	...	N. W.	Cloudless till 10 A. M. \i till 7 P. M. cloudless afterwards.
29	131.8	...	N. W. & N.	Cloudless : also slightly foggy at 6 A. M.
30	132.0	...	N. & N. W.	Cloudless.
31	129.6	...	N. W. & N	Cloudless.

\i Cirri,—i Strati, ∩i Cumuli, _i Cirro strati, ∩i Cumulo strati, _i Nimbi _i Cirro cumuli.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Monthly Results.

	Inches
Mean height of the Barometer for the month, ...	30.036
Max. height of the Barometer occurred at 9 A. M. on the 24th and 26th,	30.191
Min. height of the Barometer occurred at 3 P. M. on the 15th, ..	29.898
Extreme range of the Barometer during the month, ...	0.293
Mean of the Daily Max. Pressures,..	30.112
Ditto ditto Min. ditto, ...	29.982
Mean daily range of the Barometer during the month, ...	0.130

	°
Mean Dry Bulb Thermometer for the month, ...	70.3
Max. Temperature occurred at 3 P. M. on the 19th, ...	83.0
Min. Temperature occurred at 6 A. M. on the 29th, ...	56.2
Extreme range of the Temperature during the month, ...	26.8
Mean of the daily Max. Temperature, ...	79.3
Ditto ditto Min. ditto, ...	62.9
Mean daily range of the Temperature during the month, ...	16.4

Mean Wet Bulb Thermometer for the month, ...	63.4
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, ..	6.9
Computed Mean Dew-point for the month, ...	57.9
Mean Dry Bulb Thermometer above computed Mean Dew-point, ..	12.4
	Inches
Mean Elastic force of Vapour for the month, ...	0.488

	Troy grains
Mean Weight of Vapour for the month, ...	5.36
Additional Weight of Vapour required for complete saturation, ..	2.72
Mean degree of humidity for the month, complete saturation being unity,	0.66

	Inches
Rained No days, Max. fall of rain during 24 hours, ...	Nil.
Total amount of rain during the month, ...	Nil.
Prevailing direction of the Wind, ...	N. & N. W.

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Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of December, 1864.

Monthly Results.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	Rain on.	N. E.	Rain on.	E.	Rain on.	S. E.	Rain on.	S.	Rain on.	S. W.	Rain on.	W.	Rain on.	N. W.	Rain on.	Calm.	Rain on.	Missed.
	No. of days.																		
Midnight.	9								4		3		3		6				2
1	9		1						4		3		4		6				
2	9		1						3		3		4		6				1
3	6		1						2		4		5		6				3
4	9				1				2		1		6		7				1
5	8				1				2		2		4		5				5
6	10				1				2		3		4		7				
7	11		1		1		1		1		2		4		6				
8	11		2		1				1		4		2		6				
9	12		1		3		1		1		3		2		4				
10	13		5		1		1		1		2		4						
11	13		5						1		2		4		2				
Noon.	10		2								2		4		9				
1	10		1								1		5		10				
2	9												4		14				
3	9								1				4		13				
4	11										1		3		12				
5	7		2						2		1		3		11				1
6	7		1		1				4		1		4		9				
7	7		1		1				4		1		4		9				
8	8				1				4		1		4		9				
9	8				1				3		2		4		9				
10	8				1				3		2		4		9				
11	7				1				3		2		4		9				1

Meteorological Observations taken at Gangaroowa near Kandy, Ceylon, in the month of December, 1863.

Alt. 1560 ft.; E. Long. 80° 37′, N. Lat. 7° 17′.

All the Instruments (excepting the Max. for the Air, and Min. for the Grass) have been compared with standards.

The tension of aqueous vapour, from which are deduced the pressure of dry air, the dew point and humidity, has been found by the formula $f = f' - \frac{d}{88} \times \frac{h}{30}$ given in Mr. Drew's "Practical Meteorology," (Ed. 1855) and the tables therein given.

The dew is the weight in grains deposited on a square foot of ordinary woollen cloth exposed on a board from 6 P. M. to 6 A. M. or for as many hours as there is no rain.

The rain guage is 4½ feet above the ground.

The ozone cage is hung about 25 feet above the ground.

The direction of the wind given is that of the lowest current by the vane, and of the currents above this by the direction in which the Nimbi and Cumulo-Strati clouds are moving.

In this column a "calm" signifies that the clouds are apparently motionless: "variable," that the clouds apparently in the same or nearly the same stratum move in no fixed direction, but their parts move as if in vortices, or different masses of them move up from different quarters as if into a vast vortex, this being nearly always the case before thunder storms.

Entries, such as W S W and N N W or $\frac{\text{W S W}}{\text{N N W and calm,}}$ signify that the clouds are evidently in strata of different altitudes, that those in the lowest stratum move from W S W; those in the next higher from N N W; those in the next are apparently becalmed, and so on.

The velocity and distance in 24 hours are given by Robinson's Anemometer.

In the column for Lightning and Thunder.

L = "Lightning" when the flash is near enough to be visible.

L R = "Lightning Reflection" when the flash is so distant that only its reflection on the clouds or in the air is visible.

"Morn," is 6 A. M., "Even," 6 P. M. and "Night," 12 P. M. and "fore" and "after" are prefixed to these, as ordinarily to "Noon," to denote the 3 previous and 3 following hours.

R H. Barnes.

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Gangaroowa near Kandy, Ceylon.

December, 1863.	Barometer reduced to 32°.			Pressure of Dry Air.			Thermometer.			Dew Point.		
	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0
1	28.300	28.191	28.292	27.601	27.436	27.568	71.0	73.0	70.6	68.8	71.1	69.9
2	.310	.228	.373	.545	.457	.701	74.0	74.1	68.5	71.6	71.8	67.6
3	.389	.273	.371	.688	.480	.723	72.4	75.1	69.2	68.9	72.7	66.5
4	.370	.252	.385	.640	.458	.648	74.9	77.1	72.0	70.1	72.7	70.4
5	.393	.283	.403	.676	.493	.708	71.6	74.7	69.5	69.6	72.6	68.6
6	.371	.253	.341	.642	.547	.676	75.0	75.5	72 0	70.1	69.1	67.3
7	.384	.271	.378	.651	.532	.703	75.0	73.1	69.2	70.2	70.5	67.7
8	.410	.323	.377	.674	.614	.688	74.4	72.3	70.1	70.4	69.3	68.3
9	.412	.299	.420	.737	.563	.725	73.3	73.7	70.1	67.7	70.4	68.6
10	.410	.297	.397	.698	.577	.755	74.0	75.2	70.1	69.3	69.7	66.2
11	.396	.279	.384	.773	.618	.801	73.4	75.2	70.5	65.3	67.1	63.3
12	.410	.307	.413	.825	.659	.853	73.9	76.7	70.3	63.4	66.5	62.0
13	.424	.312	.415	.883	.694	.858	73.8	76.7	71.2	61.0	65.1	61.9
14	.409	.295	.384	.809	.625	.754	74.3	76.9	71.5	64.2	67.5	65.6
15	.401	.264	.384	.725	.655	.745	73.2	77.6	70.1	67.8	64.6	66.0
16	.393	.271	.374	.754	.580	.778	74.7	75.3	69.0	66.1	68.4	64.0
17	.375	.283	.377	.695	.586	.708	73.4	73.4	70.1	68.0	68.7	67.5
18	.372	.280	.401	.699	.601	.772	75.0	78.4	71.0	67.6	67.9	65.6
19	.406	.292	.406	.811	.716	.778	74.5	77.8	72.0	63.9	62.9	65.5
20	.415	.291	.409	.789	.678	.805	75.3	79.4	71.5	65.4	64.8	64.4
21	.412	.325	.426	.768	.608	.741	75.8	75.8	70.5	66.3	69.6	68.2
22	.421	.312	.416	.715	.579	.779	72.0	73.7	67.9	69.1	70.2	65.9
23	.423	.304	.391	.823	.708	.867	73.1	75.3	70.2	64.1	64.0	60.1
24	.414	.287	.400	.879	.692	.851	73.8	76.7	69.9	60.7	63.9	61.4
25	.381	.243	.378	.723	.646	.764	73.6	78.4	70.0	66.9	64.0	64.8
26	.366	.248	.348	.694	.506	.625	73.5	73.8	70.7	67.6	70.6	69.8
27	.373	.249	.347	.687	.553	.708	70.7	73.9	71.9	68.2	68.6	66.1
28	.352	.276	.364	.736	.584	.690	71.0	73.0	69.6	64.9	68.5	67.7
29	.373	.269	.390	.670	.542	.713	71.9	71.9	69.0	69.0	70.0	67.8
30	.376	.268	.376	.728	.602	.725	73.3	74.1	69.6	66.5	67.3	66.6
31	„	„	.363	„	„	.736	„	„	70.3	„	„	65.5
	28.388	28.278	28.383	27.725	27.586	27.740	73.5	75.3	70.3	67.1	68.3	66.2

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Gangaroowa near Kandy, Ceylon.

Humidity.			In Sun's Rays at 12 o'clock.	Minimum on the Grass.	Maximum in Air.	Minimum in Air.	Difference.	Mean.	Dew.	Rain.		
A. M. 9.30	P. M. 3.30	P. M. 10.0								A. M. 9.30	P. M. 10.0	Total.
931	942	977	116.3	66.2	74.6	67.7	6.9	71.2	0	0.101	0.512	0.613
925	930	971	91.9	68.2	76.6	69.0	7.6	72.8	0	0.116	1.554	1.670
892	926	915	120.2	„	76.4	65.5	10.9	70.9	200	0.000	0.170	0.170
858	869	949	119.2	62.4	77.9	65.5	12.4	71.7	273	0.000	0.004	0.004
936	934	972	102.1	64.8	75.5	68.3	7.2	71.9	299	0.064	0.064	0.128
854	814	857	128.3	63.8	78.6	67.0	11.6	72.8	287	0.000	0.000	0.000
858	920	952	140.1	60.4	78.1	64.8	13.3	71.5	338	0.000	0.341	0.341
878	908	944	102.0	64.0	78.2	66.8	11.4	72.5	160	0.000	0.636	0.636
834	899	954	135.0	65.6	76.8	67.8	9.0	72.3	296	0.000	0.336	0.336
859	838	880	130.7	64.2	77.0	68.0	9.0	72.5	192	0.000	0.000	0.000
768	769	790	137.0	62.0	77.1	67.6	9.5	72.3	252	0.000	0.000	0.000
709	719	735	134.0	57.2	77.5	64.5	13.0	71.0	218	0.000	0.000	0.000
659	686	737	134.7	54.0	77.6	60.6	17.0	69.1	213	0.000	0.000	0.000
716	739	826	131.0	57.3	78.0	62.9	15.1	70.5	260	0.000	0.031	0.031
838	656	876	127.5	60.5	77.5	66.3	11.2	71.9	185	0.000	0.021	0.021
756	801	847	126.7	62.6	77.5	66.5	11.0	72.0	162	0.000	0.008	0.008
838	859	917	121.6	62.8	76.3	66.5	9.8	71.4	135	0.000	0.027	0.027
788	713	838	129.8	64.2	78.7	67.6	11.1	73.1	242	0.000	0.000	0.000
708	617	809	123.5	62.6	78.0	66.3	11.7	72.2	179	0.000	0.000	0.000
726	624	791	133.6	63.2	79.7	67.5	12.2	73.6	188	0.000	0.000	0.000
735	816	926	118.3	56.1	77.3	62.9	14.4	70.1	178	0.000	0.058	0.058
939	895	938	91.6	67.1	74.8	68.7	6.1	71.7	0	0.028	0.180	0.208
747	691	716	119.9	58.2	76.4	63.9	12.5	70.2	220	0.000	0.000	0.000
651	659	757	„	59.7	77.7	67.8	9.9	72.7	113	0.000	0.000	0.000
806	627	845	124.3	58.5	78.2	65.3	12.9	71.8	178	0.000	0.000	0.000
826	904	972	105.0	64.2	75.5	68.4	7.1	71.9	84	0.000	0.948	0.948
922	844	826	108.8	67.2	74.5	68.0	6.5	71.3	0	1.133	0.003	1.136
821	863	936	88.4	66.0	73.2	68.5	4.7	70.8	28	0.023	0.018	0.041
909	941	962	89.5	66.6	73.8	67.8	6.0	70.8	0	0.062	0.364	0.426
801	803	907	131.0	64.7	76.6	67.7	8.9	72.2	0	0.000	0.000	0.000
„	„	854	„	63.4	76.2	66.0	10.2	71.1	123	0.000	0.120	0.120
816	806	877	119.4	62.6	76.8	66.5	10.3	71.7	5003	1.527	5.395	6.922

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Gangaroowa near Kandy, Ceylon.

	A. M. 9.30							P. M. 3.30						
December, 1863.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.	Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.
1	0	0	0	0	0	10.0	10.0	0	0	0	0	0	10.0	10.0
2	0	0	5.8	0	0	4.0	9.8	0	0	0	0	0	10.0	10.0
3	0.3	0	0.1	0	9.4	0	9.8	0	0	1.0	0	0	9.0	10.0
4	0.8	0	0	0	0.6	0	1.4	0	6.0	0	0	0	4.0	10.0
5	0	0	0	0	0	10.0	10.0	0	0	0	0	0	10.0	10.0
6	4.0	0	0.8	0	1.0	0	5.8	0	8.4	0	0	0	1.4	9.8
7	5.7	0	0.3	0	2.5	0	8.5	0	7.9	0	0	0	2.0	9.9
8	0	0	9.5	0	0.3	0	9.8	0	0.1	0.2	0	0	9.4	9.7
9	2.5	0	5.0	0	0.1	0	7.6	0	0.5	0	0	0	9.5	10.0
10	0.2	0	0	0	6.5	0	6.7	0	3.0	0	0	0	6.5	9.5
11	0	8.4	1.2	0	0.1	0	9.6	0	6.4	2.0	0	1.0	0	9.4
12	0.1	0	0	0	S	0	0.1	0.1	0	0	0	2.5	0	2.6
13	0	0	0	0	0	0	0.0	0	0	0	0	3.5	0	3.5
14	0	0	0	0	3.3	0	3.3	0	0	0	0	5.0	0	5.0
15	0	0	0	0	7.0	0	7.0	6.4	0	0.4	0	1.2	0	8.0
16	0.2	0	0	0	2.5	0	2.7	0	0.2	0	0	0	9.6	9.8
17	0	0	4.0	0	1.5	0	5.5	0	0	0.1	0	0	9.9	10.0
18	7.0	0	0.5	0	0.5	0	8.0	2.0	0	0.3	0.2	0.8	0	3.3
19	0.8	0	0.1	0	4.0	0	4.9	0.7	0	0	0	0.6	0	1.3
20	0.5	0	0.1	0	0.3	0	0.9	0	0	0	0.1	0.8	0	0.9
21	0	0	0	0	2.5	0	2.5	0	0.3	0	0	0	9.7	10.0
22	0	0	0	0	0	10.0	10.0	6.5	0	1.5	0	1.0	0	9.0
23	0.5	0	0	0	1.7	0	2.2	6.3	0	0	0	3.3	0	9.6
24	0	0	0	0	0.2	0	0.2	S	0	0	0	1.0	0	1.0
25	7.0	0	0	0	3.0	0	10.0	8.0	0	0	0	0.5	0	8.5
26	0	0	S	0	0	10.0	10.0	0	0	0	0	0	10.0	10.0
27	0	0	2.5	0	0	7.5	10.0	0	0	3.5	0	0	6.5	10.0
28	0	0	0	0	0	10.0	10.0	0	0	0	0	0	10.0	10.0
29	0	0	5.7	0	1.3	3.0	10.0	0	0	3.0	0	0	7.0	10.0
30	8.2	0	0.6	0	0.2	0	9.0	0	0.1	0	0	0	9.9	10.0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1.3	0.3	1.2	0.0	1.6	2.1	6.5	1.0	1.1	0.4	0.0	0.7	4.8	8.0

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Gangaroowa near Kandy, Ceylon.

P. M. 10.0							Ozone.		9.30 A.M. Direction of wind.		Velocity in feet per Second.
Cirrus.	Cirro-Stratus.	Cirro-Cumulus.	Cumulus.	Cumulo-Stratus.	Nimbus & Stratus.	Total.	6 A. M.	6 P. M.	Vane.	Lower Clouds.	
0	0	0	0	0	10.0	10.0	Ozone papers not yet received.	Ozone papers not yet received.	S W	S S W	0.88
0	0	0	0	1.0	0	1.0			W by S	N N W	1.85
3.5	0	0	0	0	0	3.5			S	Variable	0.18
0	0	0	0	0	10.0	10.0			N N E	E	4.58
8.7	0	0	0	1.3	0	10.0			N W by W	Calm	1.94
0	0	0	0	0	0	0			E by S	E by S	6.25
9.7	0	0	0	0	0	9.7			Variable	E by S	2.20
0	0	0	0	0	10.0	10.0			W S W	E N E	6.07
0	0	0	0	0	8.0	8.0			N E	?	5.90
0	0	0	0	1.0	0	1.0			N N E	E N E	9.50
0.2	0	0	0	0	0	0.2			E N E	E N E	8.80
0	0	0	0	0	0	0.0			E N E	None	7.66
0	0	0	0	0.1	0	0.1			E	Calm	4.93
0	0	0	0	0	9.7	9.7			E	N E	11.79
0	0	3.0	0	0	9.0	9.0			Variable	E N E	2.73
1.5	0	0	0	0.4	0	1.9			E	E N E	9.33
0.2	0	0.5	0	9.0	0	9.7			N N E	E by N	5.37
3.3	0	0	0	0.2	0	3.5			E by N	E N E	8.71
0	0	0	0	10.0	0	10.0			E	N E	5.11
0	0	0	0	0.2	0	0.0			E	E N E	4.58
0	0	0	0	0	10.0	10.0			E N E	E by N	6.07
0.3	0	0	0	9.3	0	9.6			N E	N E by N	2.82
0	0	0	0	0	0	0			E N E	E N E	6.16
6.6	0	0	0	0.1	0	6.7			E N E	E N E ?	8.00
0	0	3.3	0	0	0	3.3			E S E	E N E	1.76
0	0	0	0	0	10.0	10.0			N N E	E N E	8.45
0	0	9.9	0	0.1	0	10.0			N N E	N E	6.69
0.4	0	9.0	0	0	0.6	10.0			E N E	E N E ?	17.25
0	0	0	0	0	10.0	10.0			N N E	E N E	6.42
0	0	0	0	0	0	0			E N E	E N E	6.51
1.0	0	0	0	0	0	1.0			.....	.....	
1.2	0.0	0.8	0.0	1.2	3.2	6.4			.....	.....	5.95

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Gangaroowa near Kandy, Ceylon.

December, 1863.	3.30 P. M. Direction of wind.		Velocity in feet per Second.	10.0 P. M. Direction of wind.		Velocity in feet per Second.
	Vane.	Lower Clouds.		Vane.	Lower Clouds.	
1	N W	N N W	0.88	Calm	?	0.00
2	W N W	W S W	4.40	N N W	?	2.29
3	N W	Calm	0.18	S	None	0.09
4	S S W	Calm	3.52	W N W	?	0
5	N by W	E	1.58	N by E	?	0.00
6	E N E	S E & Calm	3.61	W	?	0.44
7	S W by S	S E (?)	0.18	Calm	None	0.00
8	E by S	Calm	0.35	Variable	?	0.09
9	W N W	Calm	1.14	N E	E N E	5.90
10	N	Calm	5.19	N E	Calm (?)	5.28
11	N E	Calm	5.28	E	None	8.54
12	N W by W	Calm (?)	2.73	N E by E	None	6.34
13	N W by N	E by N	2.46	E N E	Calm	3.08
14	N E	N E	4.22	E N E	N E (?)	2.02
15	E by N	E by N	8.89	N E by E	N E	0.44
16	S S W	N E by E	0.53	N by W	?	6.78
17	E N E	N E	3.26	N	E N E	3.34
18	E S E	E N E	7.22	?	E N E	11.97
19	E N E	E N E	5.19	N E	N E	2.64
20	E	E by N Calm (?)	7.22	E by S	?	4.31
21	N E	E N E & Calm	3.08	N N E	?	3.70
22	N E	E N E	2.38	N E by N	E by N	0.62
23	N N E	E by N	9.06	E N E	E N E (?)	9.42
24	N E	E N E	2.55	E S E	?	3.87
25	N E by E	E N E	10.21	N E by N	None	4.22
26	S E by E	N	1.58	Calm	N by E	0.00
27	E	E N E	3.17	E N E	E N E (?)	4.75
28	E	E N E	4.14	N N E	N E	4.66
29	N	E N E	5.02	N by E	?	2.82
30	E S E	N E	1.41	N E	?	3.78
31	.....	.....	0	E N E	None	6.51
	.....	.....	3.69	.....	.....	3.60

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Gangaroowa near Kandy, Ceylon.

Distance in Miles in 24 Hours.	Lightning and Thunder.
12.13	
31.10	
18.36	In fore even L & Th. not far, L R to S W in after even.
27.51	In after noon Th. & in after even L & Th. distant to N W & L R.
16.64	In fore even Th.
46.78	In after noon Th.
33.77	In after noon & in fore even Th.
46.04	In after noon L & Th. not far distant.
60.86	In fore even Th. In after even L R to S W.
74.61	In after even L R to S W & S by W.
97.59	
92.68	
72.70	
65.48	In after even L R in (? ?) quarter.
67.61	
79.62	
82.80	
105.42	In after even L R to S S W.
96.89	
86.44	In after even L R to S W.
62.37	
39.94	
79.12	
104.58	
93.18	
57.26	
50.93	
101.28	
60.11	In after even L R to S S W.
78.84	In after even L. R. to S by W.
87.80	
65.50	

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Gangaroowa near Kandy, Ceylon.

December, 1863.	GENERAL REMARKS.
1	Mild to rain and very damp, light rain nearly all day.
2	Mild to rain and very damp, light rain nearly all day.
3	Fog till 7 A. M.; cloudy, damp and muggy or raw; rain fore and after noon.
4	Fog till 7.30 A. M.; fine till noon; after nimb gather. & light rain in fore even.
5	Light rain till 11 A. M. & at even; heavy nimb; at 2 P. M. and after.
6	Fine & fresh till noon; after threatening nimb: but no rain.
7	Fine & fresh till noon; after threatening nimb: rain after noon & after even.
8	Fine & fresh till noon; after threatening nimb. rain after noon & after even.
9	Dull and cloudy with nimb, rain fore and after noon.
10	Fine but cloudy, mild to warm and pleasant day.
11	Fine, mild to warm, dry and fresh day.
12	Fine, mild to warm, dry and fresh day.
13	Fine, mild to warm, dry and fresh day.
14	Fine, dry & fresh till noon; cloudy after and shower at 4.20 P. M.
15	Fine, dry & fresh till near even; then cloudy with nimb. & light rain between
16	Fine, dry & fresh till noon; then cloudy & light rain in fore even. [4 & 7 o'clock.
17	Fine till noon & in after even; cloudy after noon & fore even; light rain at 3 P.M.
18	Mild to warm, dry & fresh day.
19	Fine, cool to warm, dry and fresh day.
20	Fine, mild to hot, dry and fresh day.
21	Fine till noon; then cloudy with nimb. and light rain.
22	Dull, cloudy and damp nearly all day; light showers.
23	Fine, mild to warm, dry and fresh day.
24	Fine, mild to warm, dry and fresh day.
25	Cool at morn; and later after even; fine, warm to hot, dry and fresh.
26	Cloudy & damp showers fore & after noon, continual rain fore & after even.
27	Cloudy & very damp all day; continual rain till 9 A. M.
28	Cloudy, raw & damp all day; light rain at intervals.
29	Cloudy, raw & damp all day; showers all day. [rain.
30	Fine, mild to warm and pleasant nimb: in after noon and fore even but no
31	Cool at morn, & after even, nimb. in after morn & again after noon & fore even.
	Solar Halos on 5th, 11th, 21st and 30th.

Summary of the Meteorological Observations taken at Gangaroowa near Kandy in the year, 1863.

WIND.

Number of days on which it blew in certain directions.

By the Vane.

1863.	A. M. 9.30.										P. M. 3.30.										P. M. 10.0.									
	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.
January, ...	2	9	13	2	1	2	1	1	0	0	2	11	7	2	0	0	6	3	0	0	7	14	5	1	0	1	1	1	1	0
February, ...	1	4	8	5	3	0	2	3	1	1	4	4	8	5	1	1	3	0	1	1	2	6	13	1	1	0	1	0	4	0
March, ...	3	3	2	3	5	7	7	0	1	0	2	3	2	0	0	5	10	8	1	0	0	0	1	2	3	7	2	6	9	1
April, ...	1	1	0	3	5	9	7	1	2	1	0	1	0	1	3	3	19	1	0	2	7	1	0	1	0	1	3	10	5	2
May, ...	0	0	0	0	3	15	9	1	2	1	0	0	0	0	0	8	16	3	3	1	1	0	0	0	2	7	16	1	4	0
June, ...	0	0	0	0	0	13	17	0	0	0	0	0	0	0	0	11	19	0	0	0	1	0	0	0	1	11	15	1	1	0
July, ...	0	0	0	0	1	11	18	0	0	1	0	0	1	0	1	13	15	0	0	1	1	0	0	1	1	11	17	0	0	0
August, ...	0	0	0	0	4	15	11	0	0	1	0	0	0	0	0	6	23	1	0	1	1	0	0	1	0	8	16	4	1	0
September, ...	0	0	0	0	0	20	9	0	0	1	0	0	0	0	2	15	13	0	0	0	1	0	1	0	0	6	16	5	1	0
October, ...	0	0	0	1	0	14	14	0	0	2	1	0	0	0	1	10	15	1	0	3	1	0	0	0	0	8	12	9	1	0
November, ...	5	3	6	2	1	3	4	2	3	1	1	5	2	1	4	2	10	4	0	1	9	4	0	0	1	1	0	5	8	2
December, ...	6	9	8	0	1	2	1	1	2	1	4	9	7	1	2	1	2	4	0	1	6	13	3	0	1	0	2	1	4	1
	18	29	37	16	24	111	100	9	11	10	14	33	27	10	14	75	151	25	5	11	37	38	23	7	10	61	101	43	39	6

By Vane.

The wind blew. No. of Days.	9.30	3.30	10.0	Total.
Along Meridian N or S.....	42	28	47	117
East of ditto, ...	82	70	68	220
West of ditto,.....	220	251	205	676
Calms and Variables, ...	11	5	39	55
Missed, ...	10	11	6	27
	365	365	365	1095

WIND.

Number of days on which it blew in certain directions.

By the Lower Clouds.

1863.	A. M. 9.30.										P. M. 3.30.										P. M. 10.0.									
	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.	N	N E	E	S E	S	S W	W	N W	Calms.	Missed.
January, ...	1	4	12	0	0	0	0	1	4	9	1	7	6	1	0	0	3	0	8	5	0	1	3	0	1	0	1	0	1	24
February, ...	0	5	5	0	0	0	0	1	2	15	2	9	8	0	0	1	0	0	3	5	0	2	3	1	0	0	0	0	0	22
March, ...	0	1	4	0	0	2	1	0	13	10	0	3	3	1	0	0	0	2	18	4	0	0	3	0	0	2	1	0	6	19
April, ...	0	0	2	1	1	3	1	0	9	13	0	1	1	0	0	5	9	0	9	5	0	0	0	0	0	2	0	0	3	25
May, ...	0	0	0	0	1	23	3	0	2	2	0	0	0	0	0	20	7	0	2	2	0	0	0	0	0	8	3	0	2	18
June, ...	0	0	0	0	0	21	8	0	1	0	0	0	0	0	0	15	11	0	4	0	0	0	0	0	0	5	14	0	3	8
July, ...	0	0	0	0	1	21	6	0	1	2	0	0	0	0	0	18	7	0	5	1	0	0	0	0	1	10	9	0	0	11
August, ...	0	0	0	0	2	17	5	0	0	7	0	1	0	0	2	14	5	0	8	1	0	0	0	0	1	9	5	0	4	12
September, ...	0	0	0	0	0	27	2	0	0	1	0	0	0	0	0	23	6	0	1	0	0	0	0	1	0	0	9	4	0	0	16
October, ...	0	0	0	0	4	19	2	0	3	3	0	0	0	1	1	11	3	1	12	2	0	0	0	0	1	9	0	0	3	18
November, ...	4	4	4	0	0	1	0	2	9	6	2	5	1	0	0	1	2	1	16	2	0	3	2	0	0	1	1	0	4	19
December, ...	0	18	5	0	1	0	6	1	3	3	1	12	4	0	0	1	0	1	11	1	1	9	1	0	0	0	0	0	2	18
	5	32	32	1	10	134	28	5	47	71	6	38	23	3	3	109	53	5	97	28	1	15	13	1	4	55	38	0	28	210

Lower Clouds.

	9.30	3.30	10.0	Total.
Along Meridian N or S	15	9	5	29
East of ditto, ...	65	64	29	158
West of ditto, ...	167	167	93	427
Calms and Variables, ...	47	97	28	172
Missed, ...	71	28	210	309
	365	365	365	1095

N. B.—Calms and variables are included in the same column.

The "Missed" days in the columns of "Lower Clouds" are in consequence mostly of there having been no lower clouds or, at 10 P. M., of its being too dark to see how they were moving.

Greatest distance in miles travelled by wind in 24 hours 138.63 July 1.

Least do. do. do. do. do. 2.95 Feb. 16.

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1863.	Velocity in feet per Second.			Distance in miles in 24 hours.	No. of days on which			No. of days on which Halos seen.	
	A. M. 9.30.	P. M. 3.30.	P. M. 10.0.		Lightning seen and its Thunder heard.	Only Thunder heard.	Only Lightning seen.	Solar.	Lunar.
January, ...	3.32	2.91	2.53	34.05	6	0	5	?	?
February, ...	2.04	2.47	1.72	28.53	2	2	5	?	?
March, ...	0.98	1.93	0.22	15.00	18	15	14	3	0
April, ...	1.96	5.09	0.70	33 57	16	10	15	1	2
May, ...	4.98	5.60	1 73	54.70	1	11	6	1	2
June, ...	6.20	5.80	2.49	67.48	0	6	1	3	0
July, ...	6.70	7.11	3.86	84.99	0	3	2	1	2
August, ...	5.64	5.65	2.29	67.97	4	9	8	3	2
September,...	6.90	8.09	2.57	81.13	0	0	0	6	4
October, ...	4.99	5.43	1.91	49.83	4	9	15	6	1
November, ...	2.94	2.97	1.13	34.94	5	1	13	6	0
December, ...	5.95	3.69	3.60	65.50	3	5	9	4	0
	4.38	4.73	2.06	51.47	59	71	93	34	13

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1863.	Barometer reduced to 32°.			Pressure of Dry Air.			Thermometer.		
	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0
January, ...	28.417	28.305	28.400	27.742	27.597	27.739	73.5	75.5	71.5
February, ...	.358	.244	.348	.711	.561	.701	73.5	77.0	71.6
March, ...	.359	.239	.353	.634	.484	.631	75.6	77.8	71.9
April, ...	.299	.189	.296	.553	.378	.557	76.2	79.7	72.1
May, ...	.300	.200	.292	.537	.402	.555	76.7	78.7	73.2
June, ...	.303	.218	.303	.545	.439	.600	75.3	76.5	72.0
July, ...	.294	.214	.297	.554	.451	.609	73.8	75.2	71.1
August, ...	.318	.224	.319	.596	.453	.625	74.5	76.7	71.6
September, ...	.341	.237	.334	.633	.503	.680	74.3	76.1	70.5
October, ...	.349	.234	.341	.630	.489	.650	74.6	76.7	70.9
November, ...	.365	.253	.363	.670	.515	.678	75.2	76.9	70.9
December, ...	.388	.278	.383	.725	.586	.740	73.5	75.3	70.3
Means and Totals,	28.341	28.236	28.336	27.628	27.488	27.647	74.7	76.6	71.5

Barometer.

9.30 A. M. Max. 28.475 Jan. 22. Min. 28.233 Apr. 21, range 0.242
3.30 P. M. do. 28.365 Jan. 19. do. 28.119 Apr. 18, do. 0.246
10.0 P. M. do. 28.455 Jan. 19. do. 28.204 May 12. do. 0.251
} Extreme range 0.356.

Thermometer.

Highest Max. 85.0 May 2. Lowest Max. 73.2 Dec. 28, range 11.8
Do. Min. 73.2 May 12. Do. Min. 54.4 Jan. 19, do. 18.8
} Extreme range 30.6.

Highest in Sun's rays at 12 o'clock 148.7 March 2.
Lowest Min. on the grass 47.6 Jan. 19.
Rain greatest fall in 24 hours 10 P. M. to 10 P. M. 4.126 in. Oct. 19.
Dew 54.358 grains equivalent to 1.493 in. in depth.

1863.	Dew Point.			Humidity.			In Sun's Rays at 12 o'clock.	Minimum on the Grass.	Maximum in the Air.	Minimum in the Air.	Difference.	Mean.	Ozone.
	A. M. 9.30	P. M. 3.30	P. M. 10.0	A. M. 9.30	P. M. 3.30	P. M. 10.0							
January, ...	67.6	69.0	67.0	836	807	865	„	62.6	77.0	66.1	10.9	71.6	2.7
February, ...	66.3	67.9	66.4	795	753	848	126.5	62.3	77.9	66.7	11.2	72.3	1.9
March, ...	69.9	71.1	69.8	832	812	936	131.1	64.0	80.2	67.4	12.8	73.8	2.5
April, ...	70.8	73.3	70.5	842	819	948	131.3	64.5	81.1	67.4	13.7	74.2	2.6
May, ...	71.4	72.8	70.3	848	833	912	118.8	67.2	80.2	70.1	10.1	75.1	3.8
June, ...	71.3	72.1	69.0	880	872	906	111.0	67.1	78.0	69.8	8.2	73.9	2.9
July, ...	70.5	71.4	68.3	900	888	912	105.6	66.4	76.8	69.1	7.7	73.0	3.5
August, ...	69.8	71.8	68.5	861	856	905	116.1	65.2	78.0	68.6	9.5	73.3	2.7
September, ...	69.2	70.2	66.7	848	832	886	115.5	64.2	77.5	68.0	9.5	72.7	1.4
October, ...	69.6	70.7	68.4	854	828	923	117.8	64.2	78.3	67.4	10.9	72.8	„
November, ...	68.5	70.4	68.1	808	815	917	128.4	62.1	78.6	66.4	12.2	72.5	„
December, ...	67.1	68.3	66.2	816	806	877	119.4	62.6	76.8	66.5	10.3	71.7	„
Means and Totals,	69.3	70.7	68.3	843	827	903	118.5	64.4	78.4	67.8	10.6	73.1	2.7

Greatest observed difference between Temperature and Dew Point 19.°6 { 74.°1 — 54.°5 }
on 5th February 3.30 P. M. Corresponding humidity 524.

Gangaroowa altitude above sea 1560 ft. E. Long. 80° 37′.
N. Lat. 7° 17′.

1863.	Rain.			No. of Days.	Cloud.			Dew.	
	A. M. 9.30	P. M. 10.0	Total.		A. M. 9.30	P. M. 3.30	P. M. 10.0	Grains per square foot.	No. of Days.
January, ...	1.990	6.941	8.931	18	4.9	7.3	5.9	4212	21
February, ...	0.416	5.221	5.637	14	6.9	8.3	7.2	4345	23
March, ...	0.204	12.036	12.240	22	4.0	8.7	8.5	6438	24
April, ...	0.425	14.532	14.957	17	5.1	6.9	6.8	7886	25
May, ...	3.184	3.990	7.174	22	8.6	8.9	8.1	2691	13
June, ...	4.017	6.164	10.181	27	9.2	9.3	7.6	1817	15
July, ...	3.059	7.379	10.438	29	9.1	9.4	8.5	877	11
August, ...	2.712	2.871	5.583	22	8.9	9.6	9 7	2323	12
September, ...	0.527	2.388	2.915	20	9.2	8.7	7 3	4818	22
October, ...	4.447	5.042	9.489	23	7.5	8.0	7 8	6204	23
November, ...	0.180	7.509	7.689	17	5.8	7.9	7.3	7744	27
December, ...	1.527	5.395	6.922	19	6.5	8.0	6.4	5003	25
Means and Totals,	22.688	79.468	102.156	250	7.1	8.4	7.6	54358	241

R. H. BARNES.

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APPENDIX

TO THE

JOURNAL OF THE ASIATIC SOCIETY.

Classified List of Naturalists and others engaged in the Collection of Objects of Interest.

I.—Natural History Generally.

Name.	*Address.*	*Particulars.*
Edgar L. Layard, Esq.	Curator of Museum at Cape Town.	Would be glad to assist the Asiatic Society generally.
Gerard Krefft, Esq.	Curator of Museum at Sydney.	Would exchange all sorts, especially Reptilia.
C. Horne, Esq.	Benares.	Studies Natural History generally, and would like a list of works attainable at any, or a moderate cost.

II.—Mammalia.

Gerard Krefft, Esq.	Curator of Museum at Sydney.	Can supply skeletons and skins of Australian Mammalia for Indian specimens.
Lieut. R. C. Beavan.	Purulia, Manbhoom.	Collects specimens whenever practicable.
Capt. T. Hutton.	Mussoorie.	Is writing a popular account of the Mammalia of the Himalaya.
W. Theobald, Esq., Junior.	Rangoon.	Micro-Mammalia.

Name.	*Address.*	*Particulars.*
	III.—Birds.	
Lieut. R. C. Beavan.	Purulia, Manbhoom.	Collects specimens wherever practicable.
Capt. T. Hutton.	Mussoorie.	
Capt. J. Mitchell.	Supt., Madras Museum.	Particularly wants good specimens of Birds from all countries from Calcutta to (and including) the Himalayas. In exchange offers Birds of Madras Presidency, particularly the neighbourhood of Madras.
W. E. Brooks, Esq., C. E.	Tonse Bridge, Allahabad.	Ornithology and Oology especially with reference to British Birds in India. Has several duplicate eggs, too numerous to give the whole in this notice. Requires duplicate eggs of Aquila nævia, Turdus Whitei, Regulus modestus, Anthus Ricardi, Acanthylis caudacuta, Otis Macqueeni, Anser ruficollis, Sturna stolida, Sturna anglica, Sturna fuliginosa, Procellaria hesitata, Alauda brachydactyla, &c.
W. Theobald, Esq., Junior.	Rangoon.	Oology.
	IV.—Reptiles.	
Capt. R. H. Beddome.	Conservator of Forests, Ootacamund.	Collects all Indian reptiles; has a large collection of snakes from all parts of Madras Presidency particularly from the dense forests and mountains of the western side. Has discovered some 12 or 15 new species partly named by Dr. Gunther and

Name.	*Address.*	*Particulars.*
		partly by himself; has numerous duplicates, &c. He will be glad to exchange for snakes from the Khasya Hills or Assam.
Capt. J. Mitchell.	Supt., Madras Museum.	Wants reptiles in spirit (Indian.)
Gerard Krefft, Esq.	Curator of Museum, Sydney.	Has a fine series of duplicate reptiles which he is wishing to exchange.
	V.—Fish.	
Capt. J. Mitchell,	Supt., Madras Museum.	Wants fresh-water fish of North India either stuffed or in alcohol, can furnish marine fish of Madras stuffed or in spirit and some fresh water species.
Gerard Krefft, Esq.	Sydney, N. S. W.	Can exchange Australian fishes for others.
	VI.—Mollusca General.	
Sir W. Denison, K. C. B.	Madras.	Willing to purchase or exchange.
Major G. C. Evezard.	Cantonment Magistrate, Poona.	Conchology, would exchange land shells of Western India for Burmah, Java, and Bengal land and fresh water shells. Has Cyclophorus altivagus, Indicus, &c. of Poona and its neighbourhood.
Capt. Julian Hobson.	Revenue Survey, Sattara.	Ditto.
Capt. J. Mitchell.	Supt., Madras Museum.	Wants Indian land and fresh water shells from any part of the coast, can furnish Madras sea and backwater shells.

Name.	*Address.*	*Particulars.*
George French Angus, Esq.	51, Portland Villas, Portland Road, Notting Hill, London, W.	The Mollusca generally. Has formed a very large collection in various parts of the world, many of which were new to science and have been described since his return to England, by Messrs. Adams, Crosse, Pfeiffer, himself, &c. Can offer for exchange duplicates of Australian shells, from time to time, properly named from the types. His desiderata would be chiefly the shells of the Japanese and Chinese seas, Kamschatka, Behring's straits, &c.—also a series of East Indian *pulmonifera* generally. All species from the Cape of Good Hope would also be acceptable, both land and marine.
Capt. G. E. Fryer.	Burmah Police. Sandoway, Aracan.	Collects all, but chiefly fresh-water and Land Mollusks.
J. E. Cox, Esq. M.D.	147 Phillipant St., Sydney.	Conchology.
Hon'ble W. Cooper.	Judge Hoboken, New Jersey, U. S.	Conchology in all its branches.
	VII.—Land and fresh water shells.	
Sir W. Denison, K. C. B.	Madras.	Would be glad to purchase or exchange specimens, wants particularly those of South America.
W. King, Esq.	Care of Messrs. Arbuthnot & Co., Madras.	Collects and has sundry duplicates; for instance, H. Basileus, H. ungulata, H. Malabarica: the 1st and 3rd of which may be interesting additions to some collections.

Name.	*Address.*	*Particulars.*
Capt. G. E. Fryer.	Burmah Police.	Collects all, but chiefly fresh-water and land mollusca.
W. H. Pease, Esq.	Honololu, Sandwich Islands.	Is engaged cataloguing the shells of the group, and wishes shells from the east Coast of India, also shells of Murotomidæ, mitradæ and fine examples of Cyprea onyx C. Erasta C. pantherina C. Pulchra C. lentigera also Ricinula lotata, a Var. of R. digitata found in the Seychelles. He offers in exchange, any shells from the Pacific.
Capt.R.H.Beddome.	Ootacamund.	Land shells.
C. Horne, Esq.	Benares.	Would like to know something of the land shells of these parts.
Hon'ble W. Cooper.	Hoboken N. Jersey.	Has a fine series of American land and fresh-water shells which he is willing to exchange for Indian species.
H. F. Blanford, Esq.	Bengal Club, Calcutta.	Fresh-water shells of S. E. Asia, the Eastern Archipelago, Australia, and Oceania, especially Melania, Paludomus, and Unio with a view to determine variation and distribution of the species, also any land, fresh water or marine shells from India or neighbouring countries and seas. Can exchange Ceylon Paludomi and Melaniæ and some other fresh water and land shells.
W. Theobald, Esq., Junior.	Geological Survey, Rangoon.	

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Name.	*Address.*	*Particulars.*
	VIII.—Insects General.	
Lieut. R. C. Beavan.	Camp Purulia, Manbhoom.	Collects specimens of Entomology, chiefly Lepidoptera and Coleoptera.
Sir W. Denison, K. C. B.	Madras.	Willing to purchase or exchange specimens of Lepidoptera.
Capt. A. M. Lang, R. E.	Simla.	Collects all orders.
Capt. T. Hutton.	Mussoorie.	Entomology.
Capt. J. Mitchell.	Supt., Madras Museum.	Would be glad to receive Insects in exchange for specimens in other branches of the animal kingdom.
Capt. T. M. Alexander.	Sagur.	Wants names of Books giving descriptions of species.
C. Horne, Esq.	Benares.	Collects all orders, more to assist others and to note facts regarding insects than for accumulation, will be happy to give any local insect he may possess to others needing it, does not need others in exchange; but from want of local knowledge, &c. is not at present able to furnish lists.
J. C. Cox, Esq., M. D.	Sydney, N. S. W.	Entomology.
W. Theobald, Esq., Junior.	Rangoon.	Insects and crustacea.
	IX.—Coleoptera.	
Lieut. R. C. Beavan.	Camp Purulia, Manbhoom.	Collects specimens of Entomology, Coleoptera.
A. E. Russell, Esq. B. C. S.	At present, care of Messrs. Coutts & Co., Strand, London.	Collects specimens of Coleoptera.

Name.	*Address.*	*Particulars.*
Capt. T. M. Alexander, 8, Madras Cavalry.	Sagur.	Collects specimens of Coleoptera.
W. Macleay, Esq.	Sydney, N. S. W.	Has a large number of duplicates which he wishes to exchange for Indian species.
Capt. Julian Hobson.	Sattara.	Coleoptera.
	X.—HEMIPTERA.	
Ditto.	Sattara.	
	XI.—HYMENOPTERA.	
Capt. T. M. Alexander.	Sagur.	Collects specimens of Hymenoptera.
J. G. Peels.	Pharmacéen Place de la Calandre, III. Gand, Belgium.	Collects all Hymenoptera and Diptera and is ready to exchange with any Indian Entomologist but only the abovenamed orders.
W. Theobald, Esq., Junior.	Rangoon.	
	XII.—DIPTERA.	
J. G. Peels.		See under Hymenoptera.
	XIII.—LEPIDOPTERA.	
Lieut. R. C. Beavan.	Camp Perulia, Manbhoom.	Collects specimens of Lepidoptera.
Sir W. Denison, K. C. B.	Madras.	Willing to purchase or exchange specimens.
Capt. A. M. Lang, R. E.	Simla.	Has a large collection of Lepidoptera from N. W. Himalaya and Punjab, would be glad to obtain in exchange, Lepidoptera of E. Himalayan India. Describes and figures transformations of Indian Lepid.

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Name.	*Address.*	*Particulars.*
A. E. Russell, Esq.	Care of Messrs. Coutts and Co., Strand, London.	Collects and observes the transformations. Collections have been shipped for England where he will be glad to exchange Indian for other exotic Lepidoptera.
Capt. T. Hutton.	Mussoorie.	Has on hand a monograph of silk producing species of Indian Bombycidæ and Saturiniadæ.
Capt. J. Roberts.	Late Darjeeling.	Lepidoptera.
W. S. Atkinson, Esq.	Director of Public Instruction, Cal.	Collects Lepidoptera, will be glad to exchange Silhet and Darjeeling species for those of other parts of India, especially the Punjab, Central and Southern India; wishes also an accurate local list of Lepidoptera from all parts of India with the view of determining the geographical range of species and varieties.
Capt. T. M. Alexander.	Sagur.	Collects specimens.
W. Macleay, Esq.	Sydney, N. S. W.	Collects and has a large number of duplicates which he wishes to exchange for Indian species.
Capt. Julian Hobson.	Sattara.	
	XIV.—Diotomacæ Microscope.	
Capt. J. Mitchell.	Supt., Madras Museum.	Interested in the microscope, wishes to work out the Diotomacæ of the neighbourhood and considers it desirable that the Museum should have a complete collection.
Capt. Julian Hobson.	Sattara.	Desmideæ and Diatomacæ.

Name.	*Address.*	*Particulars.*
	XV.—Botany.	
G. C. M. Birdwood, Esq., M. D.	Victoria Garden, Bombay.	Economic Botany of India, wants specimens of products and seeds of plants yielding them wants also seed vessels of all kinds for a carpological collection; willing to make exchanges, or to purchase.
H. Cleghorn, Esq., M. D.	Simla.	Economic Botany; Foresting. Has a large Herbarium of S. Indian plants and a small collection of Punjab plants.
J. L. Stewart, Esq., M. D.	Lahore.	General Economic Botany of India.
J. E. T. Aitchison, Esq., M. D.	Simla.	Botany.
Capt. R. H. Beddome.	Conservator of Forests. Madras.	Ditto.
	XVI.—Ferns.	
Capt. R. H. Beddome.	Conservator of Forests. Madras.	Collects Ferns and is publishing a work on the Ferns of India. Has duplicates of all Madras Ferns and would be glad to exchange for specimens from Khasia, Assam, &c.
	XVII.—Geology.	
F. Drew, Esq.	Srinagger, Kashmir.	Physical Geology.
Capt. T. Hutton.	Mussoorie.	Geology.
R. Bruce Foote, Esq.	Geological Survey, Madras.	
W. King, Esq.	Care of Messrs. Arbuthnot & Co., Madras.	Collects specimens illustrative of Geology and its allied branches of Natural History.

Name.	*Address.*	*Particulars.*
Capt. H. Godwin Austen.	Engineer engaged, Bhotan expedition.	Takes an interest in Geology, and has made a small collection of fossils carboniferous limestone of the Kashmir valley at Zanskar, &c. also a few from the Oolitic and other formations of that part of the Himalaya; some fossils have been sent home and have been examined by Professor Woodward; the remainder he proposes (when leisure can be obtained) to figure. Sections have been made by him of many portions of the Western Himalaya, and a Geological map of those portions that he has surveyed. To more detailed sections and an exploration of the beds abovementioned, he intends to devote a summer leave when obtainable; he has also some drawings of Buddhist remains found in the Kashmir valley.
A. M. Verchere, Esq.	Assistant Surveyor, Bunnoo, Punjab.	Has a large collection of fossils and rocks from Salt Range, Kashmir, &c., is anxious to enter into correspondence with any person who knows of beds of Carboniferous limestone in India (not in the Punjab or western Himalaya) especially in the Eastern Himalaya.
	XVIII.—Ethnology.	
W. King, Esq.	Geological Survey, care of Messrs. Arbuthnot & Co., Madras.	Is interested in evidences of the prehistoric origin of man and has in conjunction with Mr. Foote of the Geological

Name.	*Address.*	*Particulars.*
		Survey, discovered a great number of chipped stone weapons or implements, scattered about and buried in the alluvial deposits in the neighbourhood of Madras; may probably have duplicates during the year and will be glad to exchange for specimens from the parts of India especially the smooth or polished variety of these "Celts."
Capt. C. L. R. Glasfurd.	Deputy Commissioner, Sironcha, Central Provinces.	Indo-Scythian remains and affinities between the wild tribes in the vicinity of the Godavery and the Todas, Kotturs, &c. of the Neilgherries.
Ditto.	Ditto.	Would be glad to meet with a correspondent who could give him information regarding the customs religion and traditions of the Sonthals, and of the wild tribes in Assam, and on the N. E. frontier, or of Scythian remains in these parts.
	XIX.—Archæology.	
Rev. M. A. Sherring.	Benares.	Especially interested in the Archæology of Benares and its neighbourhood.
Col. J. Abbott.	Umballa.	Antiquities of all kinds, Geographical, Architectural, Ethnological, including sculpture, numismatics, engraving traditions, &c., especially such as relate to the successors of Alexander in the East.

Name.	*Address.*	*Particulars.*
C. Horne, Esq.	Benares.	Archæology, especially Buddhist remains, and collects coins for others.
Capt. H. H. Godwin Austen.	Dehra Dhoon.	Has some drawings of Buddhist remains found in the Kashmir valley.
Baboo Rajendralala Mitra.	Manicktollah, Calcutta.	Has a collection of Sanscrit MSS. of which he would gladly have copies made for those requiring them. Has the Taittiríya A'ranyaka in the press and wants a copy of Sáyana's commentary on the same for collation.
	XX.—Coins.	
Lieut. Ayrton Pullan.	Topographical Asst. of G. T. Survey, of India, Dehra Dhoon or Mussoorie.	Will be happy to make exchanges of silver or copper Bactrian or Hindoo coins.
Major George G. Pearse, R. A.	Care of Messrs. Arbuthnot & Co., Madras.	Collects Bactrian coins, gems, and ancient Indian coins; requires coins of Archibeus, Amyntas, Pantaleon, Dionysius, Artemon, Artemidorus, Epander, Zoilus, Teleppus and Pakores and any good copper coins of Eucratides and Agathon. Requires gems. Has large number of Mahamedan coins of all ages, Cashmere coins and modern coins for disposal, also coins of Alexander the Great.
Col. J. Abbott.	Commanding 5th Horse Brigade Royal Artillery, Umballa.	Has at present no wish to exchange duplicate coins.

Name.	*Address.*	*Particulars.*
C. W. Wilmott, Esq.	Assistant Commissioner, Deoghur.	Has formed a small collection of foreign and other coins.
Baboo Rajendralala Mitra.	Manicktollah, Calcutta.	Has a few coins; wishes to exchange duplicates.

NOTES AND QUERIES,

Zoology.

1. "I see in Blyth's Catalogue that he makes Inuus Assamensis of McClelland and Inuus pelops of Hodgson to be one and the same. They are totally distinct species the former inhabiting—"Subhimalayan region, Asám"—and the other being strictly confined to the Northern forests bordering on the snows in Nipal, Kumaon, Mussooree and Simla. Mr. Blyth never saw a specimen of Pithex (Inuus) pelops of Hodgson. I think Dr. Jerdon is convinced of the distinctness of our species as I showed him a living individual." Capt. T. Hutton, *Mussoorie.*

2. What books are attainable respecting the wasps and ants of India at a moderate cost? In what Journals and of what date may papers be found on these subjects? Is there any work with coloured or plain illustrations of the Dragon Flies of India? C. Horne, *Benares.*

Numismatics.

3. Since dies of the ancient coins have been engraved at Rawul Pindee it is hard to pronounce on the genuineness of coins purchased. Most of the forgeries are smeared with lamp-black mixed either with water or with oil. Boiling water or the action of oil of turpentine will remove this; whereas the oxide on an old coin can be removed only by mechanical action on the edge of a sharp tool. Col. J. Abbott, *Umballa.*

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JOURNAL

OF THE

ASIATIC SOCIETY.

SUPPLEMENTARY NUMBER.

Report of the Proceedings of the Archæological Surveyor to the Government of India for the Season of 1862-63.

NOTE.

[*Received 16th April*, 1864.]

In A. D. 634, when the Chinese pilgrim Hwen Thsang crossed the Satlaj from the westward, the first place that he visited was Po-li-ye to-lo, or *Pariyatra*, which has been identified by M. St. Martin with *Vairât*, to the northward of Jaypur. This place I have not yet visited, as my explorations during the cold season of 1862-63 were confined to Delhi, Mathura, and Khâlsi, on the line of the Jumna, and to the ancient cities lying north of that river in the Gangetic Doab, Oudh, and Rohilkhand. In these provinces, I have followed Hwen Thsang's route from *Mathura* to *Srâvasti;* and, with his aid, I have been successful in discovering the once famous cities of *Ahichhatra*, *Kosâmbi*, *Shâchi*, and *Srâvasti*. The sites of other celebrated places have likewise been determined with almost equal certainty, as *Srughna*, *Madipur*, *Govisana*, *Pilosana*, *Kusapura*, and *Dhopâpapura*. I begin the account of my explorations at Delhi, which is the only place of note not visited by the Chinese pilgrim, whose route I take up at Mathura, and follow throughout Rohilkhand, the Doab, and Oudh. The places visited during this tour are accordingly described in the following order:—

I. Delhi.
II. Mathura.
III. Khâlsi, or *Srughna*.
IV. Madâwar, or *Madipur*.

V. Kashipur, or *Govisana.*
VI. Ramnagar, or *Ahi-chhatra.*
VII. Soron, or *Sukrakshetra.*
VIII. Atranjikhera, or *Pilosana.*
IX. Sankisa, or *Sangkasya.*
X. Kanoj, or *Kanyakubja.*
XI. Kâkupur, or *Aynto.*
XII. Daundiakhera, or *Hayamukha.*
XIII. Allahabad, or *Prayâga.*
XIV. Kosam, or *Kosâmbi.*
XV. Sultânpur, or *Kusapura.*
XVI. *Dhopâpapura.*
XVII. Ajudhya, or *Sâketa.*
XVIII. Hâtila, or *Asokpur.*
XIX. Sahet-Mahet, or *Srâvasti.*
XX. Tanda.
XXI. Nimsar.
XXII. Bâri-khar.
XXIII. Dewal.
XXIV. Parasüa Kot.
XXV. Bilai-khera.
XXVI. Kâbar.

I.—DELHI.

1. The remains of Delhi are graphically described by Bishop Heber* as "a very awful scene of desolation, ruins after ruins, tombs after tombs, fragments of brick-work, free-stone, granite, and marble, scattered everywhere over a soil naturally rocky and barren, without cultivation, except in one or two small spots, and without a single tree." This waste of ruins extends from the south end of the present city of Shahjahânâbâd to the deserted forts of Rai Pithora and Tughlakabad, a distance of 10 miles. The breadth at the northern end, opposite Firuz Shah's Kotila, is about 3 miles, and at the southern end, from the Kutb Minar to Tughlakabad, it is rather more than 6 miles; the whole area covered with ruins being not less than 45 square miles. It is most probable, however, that not more than a third of this extent was ever occupied at any one period, as the pre-

* Journal, II, 290.

sent ruins are the remains of seven cities, which were built at different times by seven of the old Kings of Delhi.

2. A few other forts are recorded to have been built by the Emperors Balban, Khizr, and Mubârak; but there are no remains of them now existing, and even the sites of them are doubtful. It seems even probable that there were no remains of these three cities so far back as A. D. 1611, in the reign of Jahângir, when the English merchant, William Finch, travelling from Agra to Delhi, entered the Mogul Capital from the south, for he states that on his *left* hand he saw the ruins of *old Delhi, called "the 7 Castles and 52 gates,"* a name by which these ruins are still known in the present day. With regard to the work of the Emperor *Ghiâs-uddin-Balban*, who reigned from A. D. 1266 to 1288, I think that too great importance has been attached to its name of *Kila* or fort. The Kila *Marzghan*, which Syad Ahmed places at *Ghiâspur*, near the tomb of *Nizâm-uddin Auliya*, was built as an asylum, (مرجع *marjá*) or place of refuge for debtors. Now this asylum for debtors was still existing in A. D. 1335 to 1340, when Ibn Batuta was one of the Magistrates of Delhi. He describes it as the *Dâr-ul-aman* (دارالامن) or "House of safety," and states that he visited the tomb of Balban, which was inside this *house*. From this, as well as from its name of *Dâr-ul-aman*, I infer that the building was a walled enclosure of moderate size, perhaps not much larger than that which now surrounds the tomb of Tughlak Shah. This inference is rendered almost certain by Ibn Batuta's description of Delhi,* which he says "now consists of *four* cities, which becoming contiguous, have formed *one*." Now three of the four cities here alluded to are certainly those of *Rai Pithora, Jahân-panâh*, and *Siri*, (of which the continuous walls can be easily traced even at the present day,) and the fourth city must have been Tughlakabad. The date of the building of Jahân-panâh is not recorded; but as Ibn Batuta was employed on the insane expedition against China in 1337, and as Delhi was very shortly afterwards abandoned by Muhammad Tughlak for Deogir, it is certain that Jahân-panâh, which was built by this Emperor, must have been one of the four contiguous cities described by Ibn Batuta. I feel quite satisfied, therefore, that the *Kila-Marzghan*, called also *Dâr-ul-aman*, or "House of refuge," was not a fortress, or large fortified city, but only a small

* Travels, p. 111.

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walled enclosure surrounding his own tomb, and forming, at the same time, a place sufficiently large as an asylum for debtors and criminals.

3. The "seven forts" of old Delhi, of which remains still exist, are, according to my view, the following:—

1.—*Lâlkot*, built by Anang Pâl about A. D. 1052.

2.—*Kila Rai Pithora*, built by Rai Pithora about A. D. 1180.

3.—*Siri* or *Kila-Alai*, built by Ala-uddin in A. D. 1304.

4.—*Tughlakabad*, built by Tughlak Shah in A. D. 1321.

5.—*Citadel* of Tughlakabad, ditto ditto.

6.—*Adilabad*, built by Muhammad Tughlak about A. D. 1325.

7.—*Jahân-panâh*, ditto ditto.

In this list there is no mention of *Indraprastha*, because this celebrated Capital of the Pândus is always described as being situated on the bank of the Jumna, and because the present fort of Indrpat no doubt represents some portion of the actual site, as well as the name of the famous city of Yudhishthira. *Indraprastha* and *Delhi* were therefore two different cities, situated about 5 miles apart; the former on the bank of the Jumna above Humâyun's tomb, and the latter on a rocky hill to the south-west, surrounding the well known Iron Pillar. At the time of the Muhammadan conquest, the Hindu city of *Dilli* was confined to the two forts of *Lâlkot* and Rai Pithora; but after Firuz Shah had moved the seat of Government to Firuzabad on the very site of the ancient *Indraprastha*, the name of *Dilli* was sometimes applied to the whole of the old city, including the Musalmân fort of *Siri* and the fortified suburbs of *Jahân-panâh*. Sharf-uddin, the historian of Timur, restricts the name of old Delhi to the two Hindu forts, and describes the cities of *Siri* and *Jahân-panâh* separately. Ferishta also does the same in his account of the later kings of the Tughlak dynasty. But after Humâyun had rebuilt *Indrpat*, under the name of *Din-panâh*, and after Shir Shah had founded his fort of *Kila-Shir-Shah* on the site of Firuzabad and Indraprastha, the common people began to use the names of old Delhi and new Delhi—the former being confined to the cluster of cities about the Hindu *Dilli*, while the latter was applied to those situated on the Jumna, on the site of the ancient Indraprastha.

4. *Indraprastha* or *Indrpat*.—At the time of the *Mahâbhârata*, or 'Great War" between the Pandus and Kurus, this was one of the

well known five *pats* or *prasthas* which were demanded from Duryodhan by Yudhishthira as the price of peace. These five *pats*, which still exist, were *Pânipat*, *Sonpat*, *Indrpat*, *Tilpat*, and *Bâghpat*, of which all but the last were situated on the right or western bank of the Jumna. The term *prastha*, according to H. H. Wilson, means anything "spread out or extended," and is commonly applied to any level piece of ground, including also table-land on the top of a hill. But its more literal and restricted meaning would appear to be that particular extent of land which would require a *prastha* of seed, that is, 48 double hands full, or about 48 imperial pints, or two-thirds of a bushel. This was, no doubt, its original meaning, but in the lapse of time it must gradually have acquired the meaning, which it still has, of any good-sized piece of open plain. *Indraprastha* would therefore mean the plain of Indra, which was, I presume, the name of the person who first settled there. Popular tradition assigns the five *pats* to the five Pându brothers.

5. The date of the occupation of Indraprastha as a Capital by Yudhishthira, may, as I believe, be attributed, with some confidence, to the latter half of the 15th century before Christ. The grounds on which I base this belief are as follows :—1st, that certain positions of the planets, as recorded in the *Mahâbhârata*, are shown by Bentley to have taken place in 1424-25 B. C., who adds that "there is no other year, either before that period or since, "in which they were so situated." 2nd, in the Vishnu Purâna it is stated that at the birth of *Parikshita*, the son of *Arjuna Pândava*, the seven Rishis were in *Maghâ*, and that when they are in *Purva Ashârha*, *Nanda* will begin to reign. Now, as the seven Rishis, or stars of the Great Bear, are supposed to pass from one lunar asterism to another in 100 years, the interval between Parikshita and Nanda will be 1,000 years. But in the Bhâgavata Purâna this interval is said to be 1,015 years, which added to 100 years, the duration of the reigns of the nine Nandas, will place the birth of Parikshita 1,115 years before the accession of Chandra Gupta in 315 B. C., that is, in 1430 B. C. By this account the birth of *Parikshita*, the son of *Arjuna*, took place just six years before the Great War in B. C. 1424. These dates, which are derived from two independent sources, mutually support each other, and therefore seem to me to be more worthy of credit than any other Hindu dates of so remote a period.

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6. Indraprastha, the city of Yudhishthira, was built along the bank of the river Jumna between the Kotila of Firuz Shah and the tomb of Humâyun. At that time the river flowed upwards of one mile to the westward of its present course, and the old bed is still easily traceable from Firuz Shah's Kotila, past Indrpat and Humâyun's tomb to *Kilu Garhi*. The last place was on the immediate bank of the river, so late as the reign of Kaikobâd in A. D. 1290, as his assassins are reported to have thrown his body out of the palace window into the Jumna. The name of Indraprastha is still preserved in that of Indrpat, a small fort, which is also known by the name of *Purânah Kila* or the "old fort." This place was repaired by the Emperor Humáyun, who changed its name to *Din-pânah;* but none, save educated Musalmâns ever make use of this name, as the common people invariably call it either Indrpat or Purânah Kila. In its present form, this place is altogether a Muhammadan structure; and I do not believe that there now exists even a single carved stone of the original city of Yudhishthira. The only spot that has any claim to have belonged to the ancient city is a place of pilgrimage on the Jumna called *Nigambod Ghât*, which is immediately outside the northern wall of the city of *Shahjahânâbâd*. This Ghât is celebrated as the place where Yudhishthira, after his performance of the *Aswa-medha*, or "horse-sacrifice," celebrated the *Hom*. A fair is held at Nigambod whenever the new moon falls on a Monday. It is said to be held in honour of the river Jumna.

7. According to the Bhâgavata Purâna, Yudhishthira was the first king of Indraprastha, and the throne was occupied by the descendants of his brother Arjuna for 30 generations down to Kshemaka. This last prince was deposed, according to all the copies of the Râjâvali, by his minister Visarwa, of whose family 14 persons are said to have held the throne for 500 years. They were succeeded by a dynasty of 15 *Gautamas*, or *Gotama-vansas*, who were followed by a family of nine *Mayuras*. *Raja-pâla*, the last of the Mayuras, is stated to have been attacked and killed by the Raja of Kumaon, named *Sakâditya*, or "Lord of the Sakas." But this was only the title, and not the name, of the conqueror; for Vikramâditya is said to have obtained his title of *Sakâri* by defeating him.

8. At this point of the traditional histories, the name of Dilli makes it first appearance; but nothing is recorded regarding the

change of name, and we are left to conjecture whether the city of *Dilli** had already been founded, or whether this name has been used instead of that of Indraprastha through simple inadvertence. According to one tradition, which is but little known, the city of Dilli was founded by Raja *Dilîpa*, who was the ancestor in the fifth generation of the five Pându brothers. But this story may be dismissed at once as an ignorant invention, as Dilli is universally acknowledged to be of much later date than Indraprastha, the city of Yudhishthira himself.

9. According to a popular and well known tradition, *Dilli*, or *Dhili*, was built by Rajah *Dilu*, or *Dhilu*, whose date is quite uncertain. This tradition was adopted by Ferishta, who adds that Raja *Dilu*, after a reign of either 4 or 40 years, was attacked and killed by Raja *Phur*, or Porus, of Kumaon, who was the antagonist of Alexander the Great. If this statement could be depended upon, it might perhaps be entitled to some consideration, as giving the probable period of the foundation of Dilli. But unfortunately Ferishta's ancient chronology is a mere jumble of errors; thus, for instance, Phur's nephew, *Juna*, who should have been a contemporary of Seleukos Nikator, is said to be a contemporary of Ardashir Babekan, the founder of the Sassanian Dynasty in A. D. 226. But Ardashir himself is afterwards made a contemporary of Vikramâditya of Ujain in 57 B. C. The most probable explanation of these different dates would seem to be some confusion regarding the name of Ardashir, and perhaps the safest plan will be to accept the author's last statement, that Raja *Dilu* was a contemporary of Vikramâditya.

10. Now the story of *Dilu*, and of his defeat by Phur, Raja of Kumaon, is exactly the same as that of *Raja Pâl*, King of Dilli, and of his defeat by *Sukwanti*, (or *Sukdat*, or *Sakâditya*,) Raja of Kumaon, as related in several different copies of the Râjâvali. As in all of these the invader is said to have been defeated and slain by *Vikramâditya Sakâri*, the date of this event must be assigned either to 57 B. C. or to A. D. 79. The latter date is the true one, according to Abu Rihân; and as Sakâditya is said to have reigned 14 years in Dilli, his conquest must have taken place in A. D. 65. I confess, however, that I have but little faith in the dates of any Hindu traditionary stories, unless they can be supported by other

* Dilli or Dehli.

testimony. That the city of Dilli was founded by a Raja of similar name, is probable enough, for it is the common custom in India, even at the present day, to name places after their founders. But there is unfortunately so much uncertainty about the dates in all the stories connected with the foundation of Dilli, that it is difficult to form any satisfactory conclusion as to the truth.

11. According to Kharg Rai, the Gwalior Bhât, who wrote in the reign of Shahjahân, the last Pându Prince, named *Nilâghpati*, was king of Dilli when 3000 years of the Kaliyuga had expired, that is, in 101 B. C. In that year he was attacked by a Raghuvansi Raja, named *Sankhdhwaj*, with whom he fought 17 battles, but was eventually defeated and killed after a reign of 44 years, which brings us to 57 B. C. *Sankhdhwaj* himself is said to have been defeated and killed by the famous Vikramâditya of Ujain, who thus became king of Dilli, *(Dilil-pat-kahayo)*; his descendants are recorded to have reigned in Ujain for 792 years, during the whole of which time Dilli was deserted *(ujarh rahi)*. At the end of these 792 years, or in 792 —56¾=735¼ years complete, or A. D. 736, Dilli was re-peopled by *Bilan De Tomar*, whose descendants occupied the throne until displaced by the Chohâns under *Bisal De*, who is of course the *Visala Deva* of the two inscriptions on Firuz Shah's Pillar.

12. In this account of Kharg Rai, I recognize another version of the former story of the Raja of Dilli being overcome by the king of the Sakas, who was himself afterwards defeated by Vikramâditya. The name of *Sankhdhwaj* would appear to be only a misreading either of *Sakwant*, or of Sakdat or Sakâditya; but *Nilagh pati* is quite unlike Raja Pâl, although it might be a mistake for Tilak pati, and would thus, perhaps, have some connexion with the name of Raja Dilu.

13. I think also that I can recognize another version of the same legend in the story of *Râsal*, king of Hind, and his sons Rawâl and Barkamârys, as preserved in the Mojmal-ut-tawârikh of Rashiduddin.* In this version king Râsal, whom I identify with Raja Pâl of the Râjâvali, is driven from his throne by a rebel, who is afterwards conquered by *Barkamârys*, a name in which, though slightly altered, I still recognize the famous *Bikramâdit* or Vikramâditya.

14. The overthrow of the Sakas is universally attributed to the Vikramâditya who assumed the title of *Sakâri*, and established the era

* Reinaud Fragments Arabes, &c., p. 47.

which still bears his name, beginning in 57 B. C. But if the prince who founded this era was a contemporary of Pravarasena, Raja of Kashmir, and of the poet Kâlidâsa, as well as of the Astronomer Varâha Mihira, as there seems good reason to believe, it is quite certain that he cannot be dated earlier than the beginning of the sixth century of the Christian era. This conclusion is supported by the strong testimony of Abu Rihân, who states that the great victory over the Sakas was gained at a place called *Koror*, between Multan and Loni, by a prince named Vikramâditya, just 135 years after the prince of the same name who founded the Vikrama Samvat. As the date of this event corresponds exactly with the initial point of the *Saka*-era which was established by *Sâlivâhana*, it results that the Vikramâditya of Abu Rihân is identical with the Sâlivâhana of the popular Indian traditions. This conclusion is further strengthened by the fact that in Colonel James Abbott's list of the Rajas of Syâlkot, a reign of 90 years is assigned to Sâlivâhana, which is exactly the same as is allotted to Vikramâditya, the conqueror of the Sakas, in all the seven copies of the Râjâvali that I have seen. On these grounds, I venture, with some confidence, to fix the date of the defeat of the Saka conqueror of Dilli in A. D. 79, which is the initial point of the *Saka* era of Sâlivâhana.

15. Accepting this date as tolerably well established for an event in ancient Indian history, the foundation of *Dilli* must be placed at some earlier period, and perhaps the date of 57 B. C., or contemporary with Vikramâditya, as recorded by Ferishta, may not be far from the truth. Regarding the widely spread tradition that Dilli was deserted for 792 years, from the conquest of Vikramâditya to the time of the first Tomara Raja Anang Pâl, I think that it may be fully explained by supposing that during that period Dilli was not the residence of the king. It is almost certain that it was not the Capital of the powerful family of the Guptas, who most probably reigned from A. D. 78 to 319; and it is quite certain that it was not the Capital of the great King Harsha Varddhana and his immediate predecessors, whose metropolis was Kanoj, during the latter half of the sixth, and the first half of the seventh century. That Dilli was most probably occupied during this period, we may infer from the erection of the Iron Pillar by Raja *Dhava*, the date of which is assigned to the third or fourth century by James Prinsep. Mr. Thomas "considers that Prinsep has assigned too high an antiquity to the style of writing employed on

this monument;" but on this point I differ from Mr. Thomas, as I find, after a careful examination of the inscription, that the whole of the letters are the same as those of the records of the Gupta dynasty, whose downfall Mr. Thomas assigns to A. D. 319. I think it probable that Raja Dhava had been one of the princes who assisted in the overthrow of the once powerful Guptas, and I would therefore fix on A. D. 319 as an easily remembered and useful approximation to his true date.

16. A still earlier mention of Dilli may possibly be found in Ptolemy's *Daidala*, which is placed close to *Indabara* (perhaps Indrpat,) and midway between *Modura* or Mathura, and *Batan Kaisara*, or Sthâneswara. For the last name I propose to read Σανανάισαρα, as its position between Mathura and Ζυλυνδρίνη, or the *Jálandhar* Doab renders it almost certain that it must be Sthâneswara or Thânesar. The close proximity of *Daidala* to *Indabara*, joined to the curious resemblance of their names to Dilli and Indrpat, seems to me to offer very fair grounds for assuming their probable identity with these two famous Indian cities.

17. The ancient city of Dilli may, with tolerable certainty, be considered to have occupied almost the same site as the fort of Rai Pithora, as it is to be presumed that the Iron Pillar must have been erected in some conspicuous position, either within the old city, or close to it. With the solitary exception of the Iron Pillar, I am not aware that there are any existing remains that can be assigned with certainty to the old Hindu city of Dilli. A single pillar, amongst the many hundreds that now form the colonnades of the Kutb Minar, may perhaps belong to the old city, as it bears a figure either of Buddha the Ascetic seated in contemplation, or of one of the Jain hierarchs. No doubt some, and perhaps even many, of the pillars of these colonnades may have belonged to temples of the old Hindu city; but after a minute examination on three successive days, of the sculptures on the pillars, and of all the letters and mason's marks on the pillars and walls, I came to the unwilling conclusion that (with the two exceptions just noted,) there is nothing now existing that is older than the tenth or eleventh century.

18. According to the tradition which is universally accepted by all Hindus, the city of Dilli was re-built by Anang Pâl, the first king of the Tomar dynasty. The manuscript of Kharg Rai, which I obtained

at Gwalior, names him *Bilan De*, and a second manuscript, received from Bikaner, calls him *Bilan Deo*, or *Anang Pâl;* but Abul Fazl, Colonel Tod, and Syad Ahmad call him simply Anang Pâl; and he is so named in two inscriptions which are found on the Iron Pillar. The date of Anang Pâl, the founder of the Tomar dynasty, is variously given by the different authorities; but even the most discrepant of these dates, when carefully examined, will be found to agree within a few years of the others. The different dates given are as follows:—

19. 1st.—*The Gwalior manuscript of Kharg Rai.*—This date has already been referred to. Kharg Rai states that Dilli was deserted for 792 years after Vikramâditya, when it was re-founded by Bilan-De Tomar. This gives the year A. D. 736 as before noted. Colonel Tod refers to the same tradition when he states that Delhi lay waste for eight centuries.* But I am satisfied that he had the well known number of 792 recorded in his notes, for, in the very same page in which he makes the above statement, he gives the date of the re-building of Dilli by Anang Pâl as *Samvat* 848, which, by using his erroneous difference of 56 years, instead of 57, is equivalent to A. D. 792. But in another part of his work, Colonel Tod states that he possessed the original Hindu manuscript which Abul Fazl had used, and that the date of the re-building of Dilli by Anang Pâl was *Samvat* 829 instead of S. 429. I strongly suspect that Colonel Tod has made a mistake in this last statement, for I found, on examining the bard *Mûk-ji's* manuscript, then in the possession of his sons, that S. 821 is the date assigned to the *overthrow* of the Tomaras, and not to their *rise*. From these different statements I feel assured that he must have found the number 792 recorded in his notes without any explanation, and that he erroneously adopted it as the date of the re-founding of Dilli.

20. 2nd.—In the Ayin Akbari of Abul Fazl, the date of Anang Pâl is placed in *Samvat* 429, and the end of the Tomar dynasty in S. 848; thus limiting the rule of the *Tomaras* to 419 years, while his detailed account of the lengths of reigns amounts to 437 years. The former period has been adopted by Syad Ahmad, as I think, judiciously, because of the increased chances of error in the detail of twenty reigns. On the *Iron Pillar* this date is given as S. 419, and the fall of the dynasty is assigned to S. 648, which is most probably an error of the engraver for S. 846. The difference between these dates is 427 years.

* Rajasthan, I. 87.

21. 3rd.—In two manuscripts from Kumaon and Garhwâl, the date of the first Tomara Raja is given as 13th Bhâdon S. 846, which is equivalent to A. D. 789. But as both of these manuscripts omit the first three names, which are found in all the other manuscripts, I conclude that the date therein given is that of the fourth prince of the other lists. Deducting, therefore, from the above date the sum of the three omitted reigns, which amount to 58 years, we obtain A. D. 731 as another period for the re-building of Dilli by Anang Pâl.

22. It will be observed that the three manuscripts from Gwalior, Kumaon, and Garhwâl, place the date of the re-founding of Dilli in the eighth century A. D., whereas Abul Fazl and the inscription on the Iron Pillar refer this event to the fourth century A. D.; and so also does the author of the *Araish-i Mahfil*, who gives S. 440. Now, although Abul Fazl specially notes that his date of 429 is of the era of Vikramâditya, yet he is most undoubtedly wrong, as I will now show from other statements of his own. According to his account the Tomar dynasty, which lasted 419 years, was succeeded by the Chohan dynasty, which ruled for 83 years, and was then overcome by Sultan *Muäz-uddin Sâne*. The period of this event is stated to be A. H. 588, or A. D. 1192. Now, deducting 419 + 83, or 502 years, from A. D. 1192, we obtain A. D. 690 as the true date of Anang Pâl according to Abul Fazl's own figures, instead of S. 429 — 57, or A. D. 372, as stated in his text. But as the rule of the Chohans is limited to 41½ years in my two manuscripts from Kumaon and Garhwâl, and to 40 years in my Gwalior manuscript, I think that the authority of these three records may be taken as at least of equal weight with that of the Ayin Akbari. The true periods of the two dynasties will therefore be 419 + 41 = 460 years, which deducted from A. D. 1193, the correct date of Muäz-uddin's conquest, will give A. D. 733 for Anang Pal's re-building of Dilli, which is within three years of the traditional date of A. D. 736, already noticed.

23. The only explanation which I can propose of the great discrepancy between the true date and that which is stated in the Ayin Akbari is, that Abul Fazl simply mistook the era in which he found the date recorded. Now, if we suppose that the era of his dates was that of *Balabhi*, which began A. D. 319, we shall have S. 429 + 318 = 747 A. D. as the corrected date for the re-building of Dilli by Anang Pâl according to Abul Fazl. But by using the date of S. 419,

which is recorded on the Iron Pillar, we shall obtain A. D. 737, which is within one year of the date already fixed by the traditional story of Dilli having lain waste for 792 years, and which agrees also with the date derived from the lengths of reigns by working backwards from A. D. 1193, the period of Muäz-uddin's conquest. I therefore look upon the date of A. D. 736 for the re-building of Dilli under Anang Pâl as being established on grounds that are more than usually firm for early Indian history.

24. Accepting this date of A. D. 736, we have to account for the period of 792 years during which Dilli is said to have lain waste, when it is almost certain that the city must have been occupied at the time when Raja *Dhava* erected the Iron Pillar. Perhaps the simplest explanation is that which I have already given, viz., that during this period, Dilli was not the metropolis of the kings of Upper India. The silence of the Chinese pilgrims Fa Hian and Hwen Thsang regarding Dilli may perhaps be considered as a strong proof of the smallness of the city from A. D. 400 to 640. Fa Hian, however, does not mention any place between Taxila and Mathura, and Hwen Thsang could only have passed through Dilli once, viz., when he returned from Mathura to Thanesar. It is even possible that he may have travelled by Mirat, which then possessed one of Asoka's Pillars, for, if Dilli was not a famous place amongst the Buddhists, as I believe it was not, it is improbable that he would have visited it.

25. Dilli must, however, have been the Capital of Anang Pâl, and most probably also of several of his successors; but I have a strong suspicion that the later Rajas of the Tomar dynasty resided at Kanoj. M. Reinaud remarks that Otbi, the historian of Mahmud, makes no mention of the city of Dilli, and that only a single allusion to it is made by Abu Rihân in his *Kânun-al-masudi*. It is indeed a fact worthy of special notice that Dilli is not once mentioned in Abu Rihân's geographical chapter, which gives the routes between all the principal places in Northern India. He notices Thanesar, and Mathura, and Kanoj, but Dilli is never mentioned, an omission which could hardly have happened had Dilli been the Capital of the famous Tomar Rajas at that time. I conclude, therefore, that Dilli was not their residence in the beginning of the eleventh century, and I think that I can show with much probability that Kanoj was the metropolis of the Tomar Rajas for several generations prior to the invasion of Mahmud of Ghazni.

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26. In A. H. 303, or A. D. 915, India was visited by the well known Geographer Masudi, who records that "the King of Kanoj, who is one of the kings of es-Sind, is *Budah;* this is a title general to all kings of el-Kanoj."* The name which in the above extract is read as *Budah* by Sir Henry Elliot, is said by Gildem Meister† to be written *Bovarah*, بورة, in the original, for which he proposes to read *Poravah*, پورة for the well known *Paurava.* From the king of Oudh's Dictionary two different spellings are quoted, as *Porán*, پوران and *Forân*, فوران while in Ferishta the name is either *Korrah*, as written by Dow, or *Kuwar*, as written by Briggs. In Abulfeda the name is *Nodah*, نودة. Now, as the name, of which so many readings have just been given, was that of the king's family or tribe, I believe that we may almost certainly adopt *Tovarah*, تورة, as the true reading according to one spelling, and *Torah*, تورة, according to the other. In the Sanskrit inscriptions of the Gwalior dynasty of this name, the word is invariably spelt *Tomara*, तोमर. Kharg Rai writes *Tomár*, तोमर, which is much the same as Colonel Tod's *Tuär*, and the *Tuvár*, तुवार, of the Kumaon and Garhwâl manuscripts. Lastly, in Gladwin's Ayin Akbari I find *Tenore* and *Toonoor*, for which I presume that the original has تونور, *Tunwar*, and تنور, *Tanwar*. From a comparison of all these various readings, I conclude that the family name of the Raja of Kanoj in A. D. 915, when Masudi visited India, and again in A. D. 1017 and 1021, when Mahmud of Ghazni invaded India, was in all probability *Tovar* or *Tomar*. In favour of this conclusion there is the further testimony of Masudi that in A. D. 915 the four great kings of India known to the Musalmâns, were, 1st, the *Balharâ*, who lived in *Mânkîr;* 2nd, the king of *Kanoj;* 3rd, the king of *Kashmir;* and 4th, the king of *Sind*. As no king of Dilli is mentioned, it seems only reasonable to infer that at that time, in A. D. 915, the powerful *Tomars* most probably held their Court at Kanoj.

27. If I am correct in the above identification, then the name of the king at the time of Mahmud's invasion should correspond with that of the *Tomar* Raja, who, according to the genealogical lists, was reigning at that particular period. According to *Otbi*‡ the name of

* Sir H. M. Elliot—Historians of India, I. 57.
† Scriptorum Arab. de rebus Indicis, p. 160.
‡ Reinaud Fragments Arabes, p. 263.

this Raja of Kanoj was *Raj Pâl*, راج پال or *Râjaipâl*, راجیپال, which I take to be equivalent to Raja *Jaypâl*. Now the 14th prince in Abul Fazl's list* is *Jaypâl*, whose death, according to the lengths of reigns given in the Ayin Akbari, occurred 287 years and 6 months after the re-building of Dilli by Anang Pâl. Adding this number to A. D. 736¼, we obtain the year 1023¾ as that of the death of Jaypâl. By comparing the lists of Abul Fazl and Syad Ahmad with those of my Gwalior, Kumaon, and Garhwâl manuscripts, and taking the lengths of reigns according to the majority of these five authorities, the period elapsed from the accession of Anang Pâl to the death of Jaypâl, amounts to 285 years and 6 months. Adding this number to A. D. 736¼ we get 1021¾ as the date of Jaypâl's death, which is, I believe, within a few months of the true date. According to Ferishta,† Mahmud first heard of the alliance of the Hindu princes against his tributary the king of Kanoj, some time in the Hijra year 412, which began on 17th April, 1021. As several other events are previously recorded, and as Mahmud is said to have marched to his aid at once, I conclude that he may have left Ghazni about *October*, 1021, and as Kanoj is three months' march distant from Ghazni,‡ he must have reached that city in January, 1022. On his arrival, Mahmud found that the king of Kanoj had already been attacked and killed. The death of Jaypâl must, therefore, have occurred about December, 1021, which agrees almost exactly with the date of his death, which I have already deduced from the genealogical lists. Precisely the same date also is obtained by working backwards by lengths of reigns from the date of Muazuddin's conquest of Dilli in A. D. 1193.

28. The following lists of the Tomar dynasty of Dilli contain all the information which, up to this time, I have been able to collect. The list of Abul Fazl is given in the Ayin Akbari; and Syad Ahmad's list is printed in his *Asâr-us-Sunnâdid*. The Bikaner manuscript, which I obtained in 1846, agrees exactly in the order of the names, and very closely also in the spelling of them, with those of the printed lists just noticed; but it unfortunately wants the lengths of reigns. The Gwalior manuscript, which I procured in 1849, agrees very closely with the others as to the lengths of reigns, but it differs

* Ayin Akbari, II—94.
† Briggs, I—63.
‡ Brigg's Ferishta, I—57.

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slightly in the order of the names. As this list is appended to Kharg Rai's History of Gwalior, which was composed in the reign of Shah Jahan, it is valuable as an independent authority. The Kumaon and Garhwâl manuscripts which were obtained in 1859 and 1862 respectively, are imperfect in the same places, which shows that they must have been derived from a common source. They are valuable, however, for their agreement in omitting the last king of the other lists, named *Prithvi Rai* or *Prithivi Pâla*, who is beyond all doubt the same as the Chohan Prithivi Raja, commonly called Rai Pithora. In proof of this I may adduce the fact that the promised number of *nineteen Tomara* Rajas is complete without this name.

THE TOMARA, OR TOAR, DYNASTY OF DILLI.

Number.	Abul Fazl, Syad Ahmed, Bikaner manuscripts.	Gwalior manuscripts.	Kumaon, Garhwâl manuscripts.	Reigns. Y. M. D.	Accession. An. Dom.
1	Ananga Pâla, ...	Bilan De, ...	(Caret), ...	18 0 0	736 3 0
2	Vasu Deva, ...	(Caret), ...	(Caret), ...	19 1 18	754 3 0
3	Gangya, ...	Ganggeva, ...	(Caret), ...	21 3 28	773 4 18
4	Prithivi Malla,* ..	Prathama, ...	Mahi Pâla, ...	19 6 19	794 8 16
5	Jaya Deva, ...	Saha Deva, ...	Jada Pâla, ...	20 7 28	814 3 5
6	Nira, or Hira P.	Indrajita, ...	Nai Pâla, ...	14 4 9	834 11 3
7	Udiraj, or Adereh,	Nara Pâla, ...	Jaya Deva Pâla,	26 7 11	849 3 12
8	Vijaya, or Vacha,	Indrajita, ...	Chamra Pâla, ..	21 2 13	875 10 23
9	Biksha, or Anek,	Vacha Raja, ..	Bibasa Pâla, ..	22 3 16	897 1 6
10	Riksha Pâla, ...	Vira Pâla, ...	Sukla Pâla, ...	21 6 5	919 4 22
11	Sukh, or Nek P.,	Gopala, ...	Teja Pâla, ...	20 4 4	940 10 27
12	Gopala, ...	Tillan De, ...	Mahi Pâla, ...	18 3 15	961 3 1
13	Sallakshana P., ..	Suvari, ...	Sursen, ...	25 10 10	979 6 16
14	Jaya Pâla, ...	Osa Pâla, ...	Jaik Pâla, ...	16 4 3	1005 4 26
15	Kunwar Pâla, ...	Kumâra Pâla,	(Caret), ...	29 9 18	1021 8 29
16	ANANGA, or Anek,	ANANGA PALA,	Anek Pâla, ...	22 6 18	1051 6 17
17	Vijaya Sah, or Pâl,	Teja Pâla, ...	Teja Pâla, ...	24 1 6	1081 1 5
18	Mahatsal, Mahi P.,	Mahi Pâla, ...	Jaûn Pâla, ...	25 2 23	1105 2 11
19	Akr Pâl Akhsal, ..	Makund Pâla, ..	Ane Pâla, ...	21 2 15	1130 5 4
—	—	—	—	Capture of Dilli.	1151 7 19
20	Prithivi Raja, ...	Prithivi Pâla, ..	(Caret), ...		

29. In the above list I have adopted as a starting point the exact amount of 792 years complete from the time of Vikramâditya; or 792 $-56\frac{3}{4}=735\frac{1}{4}$ years complete, or April A. D. 736. But it is obvious

* Or Pâla.

that the period elapsed is more likely to have been 792 years and some months over, than the exact number of 792 years. For instance, 792¼ years would place the death of Jaya Pâla in A. D. 1021-11-29, that is, on the 29th December, A. D. 1021; but as the exact date of this event is not recorded by the Muhammadan historians, I have thought it best to adhere to the date obtained from the complete period of 792 years.

30. I will now consider the claim which I have put forward on the part of the *Tomara* dynasty as Rajas of Kanoj. We know that after the conquest of Kanoj by Mahmud early in A. D. 1022, the reigning family changed its residence to *Bâri*, which was three days' journey distant, on the east side of the Ganges. Mirkhond states that it was situated at the confluence of three rivers, namely, the *Saro*, the *Kûbin*, and the *Rahab*. According to Rashiduddin, the three rivers are the *Rahet*, the *Gomati*, and the *Sarju*. The second of these rivers is undoubtedly the *Gumti*, which in Sanskrit is the *Gomati*. The first is either the *Behta*, or else the *Rahria*, which joins the Behta, and the third is the *Sarain*, a good sized stream which passes by Sitapur. Both the Behta and Sarain join the Gumti near *Bâri*, which still exists as a good sized village. As Abu Rihân, who records this change of capital, was actually resident in India at the time when it took place, and as his work was written in A. D. 1031, we have the most complete authentication of Mirkhond's date of this event. I presume that the change was made on account of the exposed situation of Kanoj, which had so lately been twice captured, first, in A. D. 1017 by Mahmud, and again in A. D. 1021 by the Raja of *Kalanjar* and his allies. I conclude, therefore, *Kunwar Pâl*, or *Kumâra Pâl*, who was the successor of Jaypâl, reigned at *Bâri* from A. D. 1021 to 1051.

31. About this very time also, as we learn from several inscriptions, the kingdom of Kanoj was conquered by *Chandra Deva*, the founder of the Rahtor dynasty of Kanoj. We possess no inscriptions of Chandra Deva himself, but there is one, of his son, Madana Pâla, which is dated in S. 1154 or A. D. 1097; and another, of his grandson, Govinda Chandra, which is dated in S. 1177 or A. D. 1120. We know also from other inscriptions that Govinda's grandson ascended the throne between A. D. 1172 and 1177, or say in A. D. 1175. With these dates before us, we may safely fix Govinda's

accession in A. D. 1110 or 1115, and that of his grandfather, Chandra Deva, the founder of the dynasty, in A. D. 1050. Now this is the very date, as we learn from other sources, at which Anang Pâl 2nd, the successor of Kumâra Pâla, established himself at Dilli, and built the Fort of *Lâlkot*. On the Iron Pillar there is a short inscription in three lines, which appears to be a contemporary record of Anang Pâl himself, as the characters are similar to those of the mason's marks on the pillars of the colonnade of the Great Mosque, but are quite different from those of the two modern Nâgari inscriptions, which are close beside it. The following are the words of this short record :—"*Samvat Dihali* 1109 *Ang Pâl bahi*," which may be translated thus :—"In *Samvat* 1109 (equal to A. D. 1052) *Ang* (or "*Anang*) *Pâl* peopled Dilli" This statement is borne out by the testimony of the Kumaon and Garhwâl manuscripts, in which, opposite the name of Anek Pâl, I find recorded that in *Samvat* 1117, or A. D. 1060, on the 10th of *Mârgasiras Sudi* "he built the Fort of Dilli and called it "*Lâlkot*" (*Dili ka kot karâya, Lâlkot kahâya*). This name was still in use during the reign of the first Musalmân king, Kutbuddin Aibeg, as I find in the manuscripts of *Mûk-ji*, the bard of the *Khichi* Chohans, that Kutbuddin, soon after his accession, issued seven orders to the Hindu Chiefs, of which the fifth is "*Lâlkot tai nagâro bâjto a*," or "kettle-drums are not to be beaten in Lâlkot." This is a rule which is still observed, as none but the royal drums are beaten where the sovereign is present. Kutbuddin must therefore have taken up his residence in Lâlkot, or the fortified city of Anang Pâl.

32. Now this date, recorded on the Iron Pillar, agrees so exactly with the period of the Rahtor conquest of Kanoj, that I think we may infer, with considerable probability, that the rebuilding of Dilli by Anang Pâl was owing to the loss of the territory of Kanoj along with its new Capital of Bâri in Oudh. The accession of Anang Pâl 2nd, according to the genealogical lists, took place in A. D. 1051, and in 1052 we find a record of him on the Iron Pillar at Dilli. If, then, we suppose that he commenced rebuilding at once, there is every probability in favour of the accuracy of the statement that he finished the *Lâlkot*, or "Red Fort," of Dilli in A. D. 1060. If the site of the Red Fort may be fixed by the position of the *Anang Tâl*, as well as by that of the Iron Pillar which records the work, then the grand

old fort which now surrounds the Kutb Minar is in all probability the very Lâlkot that was built by Anang Pâl. But there are also three other points in favour of this identification, viz., 1st, that all the 27 temples destroyed by the Musalmâns would appear to have stood inside the walls of Lâlkot; 2nd, that one of these 27 temples was almost certainly built in the reign of Anang Pâl; and 3rd, that the Fort of Rai Pithora is only an extension of the older fort, which now surrounds the Kutb Minar. For these reasons I believe that this massive old fort which is still in very good order in many places, is the identical Lâlkot of Anang Pâl. The circuit of its walls, according to my survey, is 2¼ miles.

33. To this Anang Pâl I attribute the construction of a very deep tank situated one quarter of a mile to the north-west of the Kutb Minar, and which is still called Anang Tâl. This tank is 169 feet long from north to south, and 152 feet broad from east to west, with a depth of 40 feet. It is now quite dry, but Syad Ahmad quotes a statement that, in the time of Sultân Ala-uddin Khilji (A. D. 1296—1316,) the water used for the mortar of the great unfinished Minar was brought from this tank. I refer also to this Anang Pâl the founding of a village in the Balamgarh District, which is still called *Anekpur*. According to Syad Ahmad, the popular date of this work is S. 733, or A. D. 676; and he attributes it to Anang Pâl 1st, the founder of the dynasty. But I think it more probable that the date refers to the Balabhi era of A. D. 319, which will place the building of the village in 733 + 318 = A. D. 1051, in which year Anang Pâl 2nd, the true founder of Dilli, succeeded to the throne. Another work of the same time is the *Suraj Kund*, a fine deep tank near Anekpur, the building of which is attributed to Suraj Pâl, one of Anang Pâl's sons, in S. 743, which, referred to the Balabhi era, is equivalent to A. D. 1061, a date which corresponds most exactly with those which we have already obtained.

34. To Anang Pâl I attribute also the erection of at least one of the 27 temples which once stood around the Iron Pillar. Many of the pillars and beams of this temple have been made use of by the Musalmâns in the construction of the south-east corner of the colonnade of the Great Mosque. Most of them are inscribed with mason's marks, as will be noticed at length when I come to speak of the ruins in detail; and one of them bears the date of 1124, which, referred to the era of

Vikramáditya, is equivalent to A. D. 1067, in the very middle of the reign of Anang Pâl 2nd.

35. According to the traditions of the people, which I managed to pick up, the following were some of the numerous sons of Anang Pâl:—

1st.—*Tej Pâl*, or *Tejran*, who founded *Tejôra* between Gurgaon and Alwar. In the Bikaner manuscript this prince is called Vijaya Sâl, or Pâl.

2nd.—*Indra Raj*, who founded *Indragarh*.

3rd.—*Rang Raj*, who founded two places named *Târâgarh*, of which one is said to be near Ajmere.

4th.—*Achal Raj*, founded *Acheva*, or *Achner*, between Bharatpur and Agra.

5th.—*Draupada*, who is said to have lived at Asi, or Hansi.

6th.—*Sisu Pâl*, who founded *Sirsa*, and *Siswal*, said to be same as *Sirsi Patan*.

If these traditions are of any value, they will enable us to judge of the extent of Anang Pâl's dominions by the names of the places which were founded or held by his sons. According to this test, his dominions extended from Hansi on the north to Agra on the south; and on the western side they reached nearly as far as Alwar and Ajmer. To the eastward they were most probably bounded by the Ganges, beyond which the whole country was then held by the Katehria Rajputs. I see nothing improbable in these traditions of the *Tomar* possessions, and I am therefore willing to accept them as valuable additions to our present scanty knowledge of Hindu history.

36. There are traditions of a similar kind regarding the sons of another Tomar Raja, called *Karna Pâl;* but his name is not to be found in any of the lists. As, however, one of his sons was called *Bach Deo*, a name which is given in three of the lists as *Vacha Raja*, in a fourth list as *Vijaya Raja*, and in two others as *Bibasa Pâla*, I think that we have some grounds for identifying *Karna Pâl* with the father of *Vacha Deva* of the lists, more especially as the lists differ so much amongst themselves regarding the name of the father. He is variously called *Adereh*, *Udi-Ray*, *Indrajit*, and Chamra Pâl, of which the first three names are evidently only various readings of one original name. The sons of Karna Pâl, according to the popular tradition, were the following:—

1st —*Bach Deo*, who founded *Baghor*, near Narnol, and *Bachera*, or *Baghera*, near Thoda Ajmer.

2nd.—*Nag Deo*, who founded *Nâgor*, and *Nâgda* near Ajmer.

3nd—*Krishn Ray*, who founded *Kishessgarh*, 10 miles to north north-east of Alwar, and *Khâs Ganj* between Soron and Etah.

4th.—*Nihâl Ray*, who founded *Nârâyanpur*, 10 miles to west of Alwar.

5th.—*Somasi*, who founded *Ajabgarh*, between Alwar and Jaypur.

6th.—*Har Pâl*, who founded *Harsora*, 16 miles to north north-west of Alwar, and *Harsoli*, 23 miles to north of Alwar.

To this list I may add *Bahâdurgarh*, 7 miles to north-east of Alwar, which is said to have been founded by *Karna Pâl* himself.

37. The only other work of the Tomaras which has come to my knowledge is the village of *Mahipâlpur*, situated 2 miles to the east north-east of the Kutb Minar, with its great embanked lake, three quarters of a mile long and one quarter broad. Mahi Pâl, the grandfather of Jay Pâl is the 12th in the list, and reigned from A. D. 961 to 979. The embankment was the work of Firuz Tughlak. A second Mahi Pâl reigned from A. D. 1105 to 1130.

38. If these traditions are true, the dominion of the Tomaras must at one time have extended to the westward as far as Sirsa and Nâgor. To the south-west there is the District of *Toärvati*, or *Tomaravati*, between Alwar and Shekâvati; and to the south-east there is the District of *Toärghâr*, or *Tomarghâr*, between Dholpur and Gwalior, both of which still preserve the name of this once powerful clan. The Tomara dynasty of Gwalior, which held that strong fort for nearly a century and a half, traced its descent from Anang Pâl of Dilli, and the present Chief of Toärvati, as well as the Tomar Zemindars of Toärghâr, still proudly lay claim to the same origin.

39. Anang Pâl 2nd was succeeded by three other Rajas of the Tomar family, of whom the last was a prince of the same name, Anang Pâl 3rd. During the reign of this last King, Dilli was captured by the Chohans under *Visala Deva*; but the date of this event has not yet been satisfactorily ascertained. According to Abul Fazl it occurred in S. 848, which, referred to the Balabhi era, gives A. D. 1166; but as the date of *Visala's* inscription on Firuz Shah's Pillar is S. 1220 of *Vikrama*, or A. D. 1163, it is certain that the capture of Dilli must have preceded the conqueror's advance to the foot of the

hills near Khizrabad, where this pillar was then standing. This position at the foot of the Himâlaya Mountains is specially referred to in the record where Visala speaks of having made tributary all the regions between Himâvat and Vindhya. *Mûk-ji*, the bard of the Khichi Chohans, gives the date as S. 821, which, compared with Abul Fazl's date, is probably too early. The author of the *Araish-i-mahfil* says that it was rather more than 1200 *Samvat*, that is, somewhat later than A. D. 1143. The Kumaon and Garhwâl manuscripts place it in S. 1191, or A. D. 1134; but as they also place the final conquest of the Muhammadans in S. 1231, or A. D. 1174, or just 19 years too early, it seems probable that the capture of *Dilli* by the Chohans may also be ante-dated by about the same number of years. Admitting this view as probably correct, the capture of Dilli by the Chohans will be referred to A. D. 1153. Lastly, by the list which I have already given of the Tomar dynasty, the close of Anang Pâl's reign is placed late in A. D. 1151, or early in 1152, by accepting the longer reign which is found in the Gwalior manuscript.

40. By a comparison of all these dates with the period assigned to the Chohan dynasty, it seems most probable that the true date of the capture of *Dilli* by the Chohans must have been about A. D. 1152. The period assigned to the Chohans varies from 40½ years to 41½. By deducting the latter number from. A D. 1193, the date of Moazuddin Sam's conquest, we obtain A. D. 1152½ as the probable period of the capture of Dilli by Visala Deva, when, according to the Kumaon and Garhwâl manuscripts, *Chuwân takht baitha, Dilli Raj kiya*, "the Chohan sat on the throne and established his kingdom in Dilli." But although Visala thus became the actual lord of Dilli, it is almost certain that Anang Pâl was left in possesssion of his ancient kingdom as a tributary of the Chohan, while Someswara, who was either the son or grandson of Visala, received Anang Pâl's daughter in marriage. The issue of this union, the famous *Prithvi Râj*, or *Rai Pithora*, became the adopted son of the Tomar King, and was formally acknowledged as heir to the throne of Dilli. According to the *Prithvi-Rai-Charitra*, this adoption took place in A. D. 1169, at which date Prithvi Râj must have been about 16 years of age. Now, as the bard Chand records that the adoption took place during the lifetime of Anang Pâl, this last of the Tomar Kings was still reigning in A. D. 1069. We may therefore safely fix the close of his reign, at the

end of the Tomar dynasty, in the following year 1170. This will give a reign of upwards of 22 years to Prithvi Raja, which is the very term assigned to him in all the manuscripts, at the end of the Tomar dynasty. It will also add about 19 years to the length of Anang Pâl's reign, during which time I suppose him to have been tributary to Visala Deva.

41. The subject of the Chohan dynasty has been so much confused by the conflicting accounts given by Colonel Tod, that I have found it impossible to make any satisfactory arrangement, either of the names of the Princes, or of the lengths of their reigns. So far as our information goes, the only Chohan Princes of Ajmer, who were at the same time actual kings of Dilli, were Visala Deva and Prithvi Raja. During the other half of Anang Pâl's reign, I consider him to have been only the titular king of Dilli, and tributary to the paramount Sovereign of Ajmer. On Anang Pâl's death in A. D. 1171, the throne of Dilli would of course have fallen to Prithvi Raja by his adoption as the successor of the Tomar Prince. On Visala's death, which would seem to have occurred somewhat earlier, or about A. D. 1169, I infer that Someswara succeeded to the throne of Ajmer. When he was killed in battle seven years afterwards, or in A. D. 1176, the throne of Ajmer would have fallen to Prithvi Raja. But between Someswara and his son Prithvi Raja we find the names of *Châhara Deva* and *Nâga Deva* (or *Jaga Deva)*, and I can only account for their insertion by supposing that they were the tributary Rajas of Dilli under Prithvi Raja as lord paramount. This seems highly probable if we may place any dependence on the latter part of Colonel Tod's genealogical list of the Chohans, in which *Châhara Deva* is made the younger brother of Prithvi Raja. That *Châhara*, or *Châhada Deva* was a person of some consequence, we know from his coins, which are less uncommon than those of Prithvi Raja himself. Perhaps *Nâga Deva* may have been another brother or a near relative.

42. Colonel Tod gives the substance of an inscription discovered at Bijoli, which is dated in S. 1226, or A. D. 1169, during the lifetime of Someswara. In this inscription it is stated that Someswara was originally called Prithvi Raja, but "having obtained the regal dignity through Someswara, he was thence called Someswar." Now, if the date of this inscription has been rightly read, it seems most

probable that the Hansi inscription, which mentions a Prithvi Raja in S. 1224, or A. D. 1067, or just two years earlier, must refer to the father, who afterwards obtained the name of Someswara, and not to the son, who is popularly known as *Rai Pithora.* This assignment of the Hansi inscription to the father is rendered certain by another fact recorded in it, which has escaped the notice of Colebrooke, Fell, and Tod, namely, that *Kirana*, or *Kilhana*, of the *Guhila* or Grahilot race, was the maternal uncle of Prithvi Raja. Now, if there is one point undisputed in the history of Rai Pithora, it is that his mother was the daughter of the Tomar Raja Anang Pâl. I conclude, therefore, that the Prithvi Raja, whose mother was a Grahilot, must have been Someswara, whose original name, before his accession to the throne, was also Prithvi Raja.

43. With the above explanations, I now give all the lists of the Chohan dynasty which I have been able to collect, excepting that of *Mûk-ji* the Khichi bard, which agrees closely with Colonel Tod's, and is evidently erroneous.

The CHOHAN *dynasty of* DILLI.

Abul Fazl, Syad Ahmad.	Reign.			Gwalior, Kumaon, Garhwâl Manuscripts.	Reign.			Inscriptions and Coins.	Vik Samvat.	A.D.
	Y.	M.	D.		Y.	M.	D.			
Bil Deo, ...	6	1	4	Visala Deva, .	6	1	4	Vella Deva.		
Amara Gangu, ...	5	2	5	Gangeva, or Amara Deva,	5	2	3			
Kehar Pâl, ...	20	1	5	Pahadi, or Pada Deva,	8	1	5	Visala Deva, or Vigraha,	1220	1163
Sumer, ...	7	4	2	Samas, or Suveras, ...	7	4	2	Someswara, or Prithvi Raja 1st.	1224	1167
Jahir, ...	4	4	8	Vehan De, or Bala Deva, .	4	4	1	Chahada Deva.	1226	1169
Nâg Deo, ...	3	1	5	Jag Deo, or Jagarmangur,	3	5	1			
Pithora or Prithvi Raja, ...	48	5	1	Prithvi Raja, .	6	1	1	Prithvi Raja.		

On comparing these lists, I think it very probable that *Bil Deo* of Abul Fazl is the *Vella Deva* of the Inscription on Firuz Shah's Pillar,

and that *Kehar Pâl* may be a corruption of the last two syllables of *Vigahar* or *Vigraha*. The other names require no remarks.

44. The reign of Prithvi Raja has been rendered memorable by three events which form separate parts of the rather voluminous work of the bard *Chand*, named *Prithvi Râj Chohan Râsa*. The work is divided into several *Khands*, or books, which are generally known by the names of the subjects of which they treat; thus, the *Kanoj Khand* gives the story of the forcible abduction of the not unwilling daughter of Jaya Chandra, the Rahtor Raja of Kanoj; while the *Mahoba Khand* relates the various fortunes of the successful war with *Parmâlik*, or *Paramârdi Deva*, the Chandel Raja of Mahoba, and the last books are devoted to the great struggle between the Hindus and Musalmâns, which ended in the final overthrow of Prithvi Râj, and the establishment of Kutb-uddin Aibeg on the throne of Dilli as a dependant of the paramount Sovereign Muazuddin Ghori.

45. The date of the abduction of the Kanoj Princess may be assigned with great probability to the year A. D. 1175, as we know from inscriptions that *Vijaya Chandra*, the father of *Jaya Chandra*, was still living in 1172, and that Jaya Chandra had succeeded to the throne *before* 1177. This event cannot, therefore, be placed earlier than 1175, and as Prince *Rainsi*, the issue of this union, was able to bear arms in the last fatal battle with the Musalmâns in 1193, in which he was killed, it is not possible to place the date of the abduction *later* than 1175.

46. The date of the great war with the Chandel Prince of Mahoba is given in the *Mahoba Khand* of Chand's poem as Samvat 1241, or A. D. 1184. My copy of this portion of the poem was obtained in Mahoba itself, and I have every reason to believe in the correctness of the year named, as it is borne out by two existing inscriptions of *Paramârdai Deva*, the Chandel Raja, which are dated respectively in Samvat 1224 or A. D. 1167, and S. 1241, or A. D. 1184.

47. The date of the final conquest of Dilli by the Musalmâns is variously given by the different authorities. Thus, Ibn Batuta has A. H. 584, or A. D. 1188; Abul Fazl has A. H. 588, or A. D. 1192; and Ferishta has A. H. 589, while Syad Ahmad has adopted A. H. 587. The last date, however, is undoubtedly erroneous, as it is founded on a misreading of the written date on the Eastern Gateway of the

Kutb Masjid. Syad Ahmad has read the unit of this date as سبع, *Saba*, or 7, whereas it is clearly and unmistakeably تسع, *tisa*, or 9. The error has arisen from the omission of the two points of the initial letter in Syad Ahmad's plate of this inscription. My attention was particularly drawn to this date by Mr. Thomas' note on Syad Ahmad's date, which, as he says, "anticipates the epoch ordinarily assigned to the Muhammadan conquest of India, by two years." I examined this portion of the inscription minutely with a telescope, and I found the two dots or points of the inital letter of تسع, *tisa*, which are omitted in Syad Ahmad's lithographed copy of the inscription, are quite distinct, *one over the other*, between the words *Sanh* and *wa*, and immediately over the unit of the date, which is placed below those words. The date of the capture of Dilli, as here given by Kutb-uddin himself, is therefore the year A. H. 589, which began on 7th January, 1193.

48. The only work which is attributed to Prithvi Raja is the extensive fort to the north and east of Anang Pâl's Lâlkot, which is still called *Kilah Rai Pithora* or "Pithora's Fort." From the north-west angle of Lâlkot the lines of Rai Pithora's walls can still be distinctly traced, running towards the north for about half a mile. From this point they turn to the south of east for one and a half miles, then to the south for one mile, and lastly, to the west and north-west for three-quarters of a mile, where they join the south-west angle of Lâlkot, which being situated on higher ground, forms a lofty citadel that completely commands the Fort of Rai Pithora. The entire circuit of the walls of the two forts is 4 miles and 3 furlongs, or rather more than half the size of the modern city of Shahjahânâbâd.

49. Up to this point I have endeavoured to trace the outline of the history of Hindu *Dilli*, partly from existing monuments, partly from inscriptions, and partly from other records, both printed and manuscript. The history of Muhammadan *Dihli*, or *Delhi*, according to our corrupt spelling, will be found in ample detail in Ferishta and other Moslem authors. I will now therefore confine my remarks to a description of the many noble remains of by-gone days, which, either by their grand size, their solid strength, or their majestic beauty, still proudly testify that this vast waste of ruins was once Imperial Delhi, the Capital of all India.

Hindu Remains.

50. The most ancient monuments of Delhi are the two Stone Pillars bearing the edicts of Asoka, both of which were brought to the Capital by Firuz Shah Tughlak, about A. H. 757, or A. D. 1356. The account of the removal of these pillars from their original sites is given in detail by *Shams-i-Sirâj*, who was most likely an eye-witness of their re-erection in Firuzâbâd, as he records that he was 12 years of age at the time when they were set up.* This circumstantial account of a contemporary writer at once disposes of Colonel Tod's story† that Firuz Shah's Pillar was originally standing "at *Nigambod*, a place of pilgrimage on the Jumna, a few miles below Delhi, whence it must have been removed to its present singular position." *Nigambod* still exists as a place of pilgrimage, being a *ghât* immediately outside the northern wall of the city of Shahjahânâbâd. It is therefore *above* the city of Delhi, instead of being a few miles *below* it, as described by Colonel Tod.

51. *Firuz Shah's Pillar*, according to Shams-i-Sirâj, was brought from a place which is variously called *Topur*, *Topera*, *Toparsuk*, *Tohera*, *Tawera*, and *Nahera*.‡ The place is described as being "on the bank of the Jumna, in the district of Salora, not far from Khizrabad, which is at the foot of the mountains, 90 koss from Delhi." The distance from Delhi and the position at the foot of the mountains point out the present Khizrabad on the Jumna, just below the spot where the river issues from the lower range of hills, as the place indicated by Shams-i-Sirâj. *Salora* is perhaps Sidhora, a large place only a few miles to the west of Khizrabad. From the village where it originally stood, the pillar was conveyed by land on a truck to Khizrabad, from whence it was floated down the Jumna to Firuzabad, or new Delhi. From the above description of the original site of this pillar, I conclude that the village from whence it was brought was perhaps the present *Paota*, on the western bank of the Jumna, and 12 miles in a direct line to the north-east of Khizrabad. Now, in this immediate neighbourhood, on the western bank of the Jumna, and at a distance of 66 miles from Thanesar, Hwen Thsang places the ancient Capital of *Srughna*, which was even then (A. D. 630—640)

* Journal of Archæological Society of Delhi, 1—74.
† Rajasthan, II—452.
‡ Journal of Archæological Society of Delhi, pp. 29-75.

in ruins, although the foundations were still solid. The Chinese Pilgrim describes *Srughna* as possessing a large *Vihâr*, and a grand stupa of Asoka's time containing relics of Buddha, besides many other stupas of *Sâriputra*, *Maudgalyayana*, and other holy Buddhists. From the very exact agreement in the descriptions of the site of the village of *Taopar* with that of the city described by Hwen Thsang, I feel quite satisfied that the original site of Firuz Shah's Pillar was somewhere in the immediate vicinity of the ancient Capital of Srughna. I think it probable also that in the work *Suk*, which is appended to one of the various readings of the name of the village of *Taopar*, we still have a fair approximation to *Sughan*, the popular form of the Sanskrit *Srughna*.

52. When the pillar was removed from its original site, a large square stone was found beneath it, which was also transported to Delhi (a similar large square stone was found along with the Zamaniya Pillar which now stands in the grounds of the Benares College). This stone was again placed beneath the pillar in its new situation on the top of the three-storied building called Firuz Shah's Kotila, where it may now be seen, as a gallery has been pierced through the solid masonry immediately beneath the base of the pillar. According to Shams-i-Sirâj, the whole length of the shaft was 32 *gaz*, of which 8 gaz were sunk in the building. As the pillar at present stands, I found the total height to be 42 feet 7 inches, of which the sunken portion is only 4 feet 1 inch. But the lower portion of the exposed shaft to a height of 5 feet is still rough, and I have little doubt, therefore, that the whole of the rough portion, 9 feet in length, must have been sunk in the ground on its original site. But according to Shams-i-Sirâj, even more than this, or one-fourth of its whole length, that is, 10 feet 8 inches, was sunk in the masonry of Firuz Shah's Kotila. This I believe was actually the case, for on the west side of the column there still remain *in situ* the stumps of two short octagonal granite pillars that would appear to have formed part of a cloister or open gallery, around a fourth story, which cannot have been less than 6½ or 7 feet in height. I conclude, therefore, that the statement of Shams-i-Sirâj is quite correct.

53. When the pillar was at last fixed, the "top was ornamented with black and white stone-work surmounted by a *gilt* pinnacle, from which no doubt it received its name of *Minâr Zarin* or 'Golden

Pillar.' This gilt pinnacle was still in its place in A. D. 1611, when William Finch entered Delhi, as he describes the Stone Pillar of *Bimsa*, which, after passing through *three* several stories, rises 24 feet above them, all having on the top *a globe surmounted by a crescent.*" The 24 feet of this account are probably the same as the 24 *gaz* of the other, the *gaz* being only a fraction over 16 inches.

54. The great inscription of Asoka, which is engraved on this pillar, attracted the notice and stimulated the curiosity of Firuz Shah, who assembled a number of learned Brahmans to decypher it, but without success. "Some, however, interpreted the writing to signify that no one would ever succeed in removing the pillar from the spot on which it originally stood, until a king should be born, by name Firuz Shah." This sort of unblushing mendacity is still but too common in India. Almost everywhere I have found Brahmans ready to tell me the subject of long inscriptions, of which they could not possibly read a single letter. Equally untrue, although not so shameless, are the accounts of this inscription given by Tom Coryat. In a letter to L. Whittaker,* he says "I have been in a city of this country called Delee, where Alexander the Great joined battle with Porus, King of India, and defeated him, and where, in memory of his victory, he caused to be erected a brazen pillar, which remains there to this day." The same story, with additions, was repeated to the unsuspecting Chaplain Edward Terry,† who says, "I was told by Tom Coryat (who took special note of this place) that he being in the city of Delee, observed a very great pillar of marble, with a *Greek* inscription upon it, which time hath almost quite worn out, erected (as he supposed) there and then by Great Alexander to preserve the memory of that famous victory." This erroneous opinion of Coryat was adopted by most of the early English travellers, as noticed by Purchas,‡ who states that these inscriptions are in *Greek* and *Hebrew*, and that some affirm the pillar was erected by Alexander the Great. Coryat's mistake about the Greek most probably arose from an actual inspection of the inscription, in which he would naturally have recognized the ⊙, ⏃, ⟨, +, Λ, |, ▭, Ξ, and ▷ as Greek letters. The similarity struck James Prinsep also. A notable ex-

* Kerr's Voyages and Travels, IX—423.
† Journal, p. 81.
‡ Kerr, VIII—293, note 6.

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ception to the other English travellers is William Finch, who simply states that "it has inscriptions."

55. The mistakes that have been made about this column are, however, not confined to its inscriptions, as we have seen above, where Coryat calls it a "*Brazen* Pillar." Strange to say, a similar mistake has been made by the generally accurate Bishop Heber, who calls it "a high black pillar of *cast-metal;*" and again, in describing the Iron Pillar, he calls it a Metal Pillar like that in Firuz Shah's Castle*. Again Colonel Tod has identified this pillar with the Nigambod column alluded to by the bard Chand "as telling the fame of the Chohan." It is quite possible that some other pillar may once have stood at Nigambod; but as the golden column of Firuz really does "tell the fame of the Chohan," and as its inscriptions were recorded only thirty years prior to Chand's death, it seems most probable that his allusion must be to this particular pillar. The name of Nigambod may perhaps be a corruption of the real name of the place where the column then stood, or an ignorant interpolation in the text of a date later than Firuz Shah.

56. The "Golden Pillar" is a single shaft of pale pinkish sandstone, 42 feet 7 inches in length, of which the upper portion, 35 feet in length, has received a very high polish, while the remainder is left quite rough. Its upper diameter is 25·3 inches, and its lower diameter 38·8 inches, the diminution being ·39 inch per foot. Its weight is rather more than 27 tons. In its dimensions it is more like the Allahabad Pillar than any other, but it tapers much more rapidly towards the top, and is therefore less graceful in its outline.

57. There are two principal inscriptions on Firuz Shah's pillar, besides several minor records of pilgrims and travellers from the first centuries of the Christian era down to the present time. The oldest inscriptions for which the pillar was originally erected, comprise the well known edicts of Asoka, which were promulgated in the middle of the third century B. C. in the ancient *Pali*, or spoken language of the day. The alphabetical characters, which are of the oldest form that has yet been found in India, are most clearly and beautifully cut, and there are only a few letters of the whole record lost by the peeling off of the surface of the stone. The inscription ends with a short

* Journal II., pp. 291—307.

sentence, in which King Asoka directs the setting up these monoliths in different parts of India as follows:—

"Let this religious edict be engraved on stone pillars *(sila thambha)* and stone tablets *(sila phalaka)*, that it may endure for ever." In this amended passage we have a distinct allusion to the rock inscriptions, as well as to the pillar inscriptions. As this is the longest and most important of all the pillar inscriptions of Asoka I made a careful impression of the whole, for comparison with James Prinsep's published text. The record consists of four distinct inscriptions on the four sides of the column facing the cardinal points, and of one long inscription immediately below, which goes completely round the pillar. I may mention that the word *Ajakânâni*, at the end of the 7th line south face, was not omitted "accidentally," as James Prinsep supposed, by the original engraver, but has been lost by the peeling away of the stone for about 4 inches. The vowel *i* attached to the final letter is still quite distinct. The penultimate word on the eastern face is not *agnim*, as doubtfully read by Prinsep, but *abhyum*, and, as he rightly conjectured, it is the same word that begins the 19th line. The last word in the 11th line, which puzzled Prinsep, is not *atikata*, but *atikantam*, the same as occurs near the beginning of the 15th line. The few corrections which I have noticed here show the accuracy of Burnouf's opinion, that a new collation of the pillar inscriptions would be of the greatest value. I am happy to say that I have now made new copies of the inscriptions on the pillars at *Delhi*, *Araraj*, and *Navandgarh*, for collation by competent scholars.

58. The last 10 lines of the eastern face, as well as the whole of the continuous inscription round the shaft, are peculiar to the Delhi pillar. There is a marked difference also in the appearance of this part of this inscription. The characters are all thinner and less boldly cut; the vowel marks are generally sloping, instead of being horizontal or perpendicular, and the letters *j*, *t*, *s*, and *h* are differently formed from those of the preceding part of the inscription. These new forms are exactly the same as those of the rock inscription near Khâlsi, on the Jumna, which is only a few miles above *Paota*, the probable site from whence the Pillar was brought by Firuz Shah.

59. The second inscription is that which records the victories of the Chohan Prince Visala Deva, whose power extended "from Himâdri to Vindhya." This record of the fame of the Chohan consists of two

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separate portions, the shorter one being placed immediately above Asoka's edicts, and the longer one immediately below them. But as both are dated in the same year, viz., S. 1220, or A. D. 1163, and refer to the same Prince they may be considered as forming only one inscription. The upper portion, which is placed very high, is engraved in much larger characters than the lower one. A translation of this inscription was published by Colebrooke in the Asiatic Researches, Vol. III. p. 130; and his rendering of the text has been verified by H. H. Wilson from a copy made by Mr. Thomas.* The reading of Sri *Sallakshana* proposed by Mr. Thomas is undoubtedly correct, instead of *Sri Mad Lakshana*, as formerly read. I would suggest also that the rendering of *Châhumâna tilaka*, as "most eminent of the tribe which sprang from the arms," (of Brahma,) seems to me much less forcible than the simple translation of "Chief of the *Châhumans*" or Chohân tribe. I believe also that there is an error in referring the origin of the Chohâns to Brahma, as *Mâk-ji*, the Bard of the Khichi Chohans, distinctly derives them from the *Anal kund*, or fount of fire on Mount Abu, an origin which corresponds with that assigned to them by Colonel Tod. It is *Châluk Rao*, the founder of the *Châlukya*, or *Solânkhi* tribe, that is fabled to have sprung from Brahma.

60. The minor inscriptions on Firuz Shah's Pillar are of little interest or importance. They are however of different ages, and the more ancient records must have been inscribed while the pillar yet stood on its original site, under the hills to the north of *Khizrabad*. One of the oldest is the name of *Sri Bhadra Mitra*, or *Subhadramitra*, in characters of the Gupta era. This is written in very small letters, as are also two others of the same age. In larger letters of a somewhat later date, there are several short inscriptions, of which the most legible is *Surya Vishnu Subarnakakana*. A second begins with *Hara Singha Subarnakakana*, the remainder being illegible, with exception of the word *Kumâra*. A third reads *Charma Subana*, the second letter being somewhat doubtful. This record is extended in another place to *Charma Subanakshâra*. Of a much later date is the name of the *Saiva* mendicant *Siddh Bhayankarnâth Jogi*, followed by a *trisul*. The name of this wandering mendicant is also recorded in the very same characters, but simply as "*Bhayankar Nâth*," in one of the *Barâbar* caves in Bihar. On the northern face there are two still

* Thomas's "Prinsep's Essays," I. 325.

later inscriptions in modern Nâgari, both of which bear the same date of Wednesday, 13th, waning moon of *Chaitra* in *Samvat* 1581, or A. D. 1524. The longer inscription contains the name of *Suritân Ibarâhim*, or Sultan Ibrahim Lodi, who reigned from A. D. 1517 to 1525.

61. The second of Asoka's Delhi Pillars is now lying in five pieces near Hindu Rao's house, on the top of the Hill to the north-west of Shahjahânâbâd. The whole length of these pieces was 32¾ feet, but the upper end of the middle piece, which was inscribed with Asoka's edicts, was sawn off some years ago, and sent to Calcutta, where it may now be seen in the Asiatic Society's Museum. The portion of the shaft that was below the inscription still measures 18 feet, and that which was above it, 12 feet. As the end of the shaft is still rough, it seems probable that the polished portion could not have been more than 32 feet in height, which is somewhat less than that of the other known pillars of Asoka. Indeed, this pillar is described by Shams-i-Sirâj as being smaller than the other, a description which can apply only to its height, as its diameter is somewhat greater. From its broken state it is not easy to obtain correct measurements of its thickness. At the point where the inscribed piece was sawn off, the diameter is 33.44 inches; and my measurements make the upper diameter 29½ inches, and the lower diameter of the smoothed portion 35.82 inches. The rough thick end is about 38 inches in diameter. These measurements make the diminution of the pillar just one-fifth of an inch per foot.

62. According to Shams-i-Sirâj this column was brought from Mirat by Firuz Shah, and erected near its present position in the *Koshak Shikar*, or "hunting palace." The position of the palace has already been determined by the researches of Messrs. Cope and Lewis;* but the following statements of William Finch will place this identification of site beyond all dispute. In A. D. 1611 he describes the city (that is, of Shir Shah,) as being two koss, or 2½ miles, in length from gate to gate, and about two koss from thence he places "the ruins of a hunting seat or *mole (Mahal)* built by *Sultan Bemsa*, a great Indian Sovereign."† This description agrees exactly with the position of the broken pillar, which is about 2¾ miles to the north-west of the *Lâl Darwâza*, or north gate of the old city of Shir Shah, which is

* Journal of Archæological Society of Delhi.
† Kerr's Voyages and Travels, VIII, 292.

itself about 2½ miles distant from the south gate, to the westward of *Dinpanâh*, or *Purâna Kilah.*

63. According to the popular belief, this pillar was thrown down by an accidental explosion of a powder magazine in the time of Farokhsiar, who reigned from A. D. 1713 to 1719. This tradition is rendered almost certain by the statements of Padre Tieffenthaler, who resided in India between A. D. 1743 and 1786. He saw the pillar lying just as it is now, in five pieces, but he was informed that it was standing erect not long before, and that it was thrown down by an explosion of gunpowder.

64. The inscriptions on this pillar are very imperfect, owing to the mutilated and worn surface of the stone. Such portions as remain have been carefully examined by James Prinsep, who found them to be "so precisely the duplicates" of the other inscription, that he did not think "it worth while to make them the subject of a separate note."* The remaining portions, which correspond with parts of the inscriptions on the north, south, and west faces of the other pillar, have been lithographed by Prinsep in Plate XLII. Vol. VI. of this Journal.

65. The *Iron Pillar* of Delhi, which is the next work in point of antiquity, is one of the most curious monuments in India. Many large works in metal were no doubt made in ancient times, such, for instance, as the celebrated Colossus of Rhodes, and the gigantic statues of the Buddhists, which are described by Hwen Thsang. But all of these were of brass or copper, all of them were hollow, and they were all built up of pieces rivetted togther, whereas the Delhi Pillar is a solid shaft of mixed metal upwards of 16 inches in diameter, and about 50 feet in length. It is true that there are flaws in many parts, which show that the casting is imperfect; but when we consider the extreme difficulty of manufacturing a pillar of such vast dimensions, our wonder will not be diminished by knowing that the casting of the bar is defective. The total height of the pillar above ground is 22 feet, but the smooth shaft is only 15 feet, the capital being 3½ feet, and the rough part of the shaft below also 3½ feet. But its depth under ground is considerably greater than its height above ground, as a recent excavation was carried down to 26 feet without reaching the foundation on which the pillar rests. The whole length of the Iron Pillar is therefore upwards of 48 feet, but how much more, is not known,

* Journal of Asiatic Society of Bengal, VI, 794.

although it must be considerable, as the pillar is said not to have been loosened by the excavation. I think, therefore, it is highly probable that the whole length is not less than 60 feet. The lower diameter of the shaft is 16.4 inches, and the upper diameter is 12.05 inches, the diminution being .29 of an inch per foot. The pillar contains about 80 cubic feet of metal, and weighs upwards of 17 tons.

66. The Iron Pillar records its own history in a deeply cut Sanskrit inscription of six lines on its western face. The inscription has been translated by James Prinsep, who remarks that "the pillar is called the arm of fame" *(Kirtti bhuja)* "of Raja *Dhava*, and the letters cut upon it are called the typical cuts inflicted on his enemies by his sword, writing his immortal fame." It is stated that he subdued a people on the *Sindhu*, named *Vahlikas*, who must be the *Bahikas* of the Panjâb, and lastly, that he "obtained with his own arm an undivided sovereignty on the earth for a long period." The above is the whole of the meagre information that can be gathered from this inscription, save the bare fact that the Raja was a worshipper of Vishnu. The date of the inscription is referred by James Prinsep to the third or fourth century after Christ; but Mr. Thomas considers that this is "too high an antiquity for the style of writing employed on the monument." I agree, however, with Prinsep, as the characters appear to me to be exactly the same as those of the Gupta inscriptions. I have already suggested the year A. D. 319, which is the initial point of the Balabhi or Gupta era, as an approximate date for Raja *Dhava*, as I think it not improbable that he may have assisted in the downfall of the powerful Gupta dynasty.

67. According to universal tradition, the Iron Pillar was erected by *Bilan Deo*, or Anang Pâl, the founder of the Tomara dynasty, who was assured by a learned Brahman that, as the foot of the pillar had been driven so deep into the ground that it rested on the head of *Vásuki*, king of the serpents, who supports the earth, it was now immoveable, and that dominion would remain in his family as long as the pillar stood. But the Raja, doubting the truth of the Brahman's statement, ordered the pillar to be dug up, when the foot of it was found wet with the blood of the serpent king, whose head it had pierced. Regretting his unbelief, the Iron Pillar was again raised, but owing to the king's former incredulity, every plan now failed in fixing it firmly, and, in spite of all his efforts, it still remained loose *(dhila)* in the

ground, and this is said to have been the origin of the name of the ancient city of *Dhili.*

68. This tradition has been variously reported by different authorities, but the main points are the same in all. Colonel Tod states that the Iron Pillar is said to be resting on the head of the *Sahes Nâg*, who is the same as *Vásuki*, the serpent king. A lady traveller, who visited Delhi between 1804 and 1814, heard the tradition in a somewhat different way. A Brahman told the king that if he could place the seat of his government on the head of the snake that supports the world, his kingdom would last for ever. The Iron Pillar was accordingly driven into the ground on its present site, under the superintendence of the Brahman, who announced that the lucky spot had been found. On hearing this, a courtier, jealous of the Brahman's influence, declared that the pillar was not placed over the serpent's head, but that he could point out the true place, which he had seen in a dream. The pillar was accordingly taken up by the Raja's order, and, agreeably to the Brahman's prediction, the foot of it was found wet with the blood of the serpent's head. This tradition is also imperfectly related in Purchas's Pilgrims, on the authority of English travellers who visited India during the reigns of Jahângir and Shahjahan. Purchas states that the *Rase* (Raja) who founded Delhi "by advice of his magicians, tried the ground by driving an iron stake, which came up bloody, having wounded a snake. This the *Ponde*, (Pânde or Pandit,) or magician, said was a fortunate sign." In all these different versions of the erection of the Iron Pillar, the main points of the story are the same, and the popular belief in this tradition is confirmed by the well known verse:—

"*Kîllî to dhîllî bhai,*
"*Tomar bhaya mat hin.*"

"The pillar became loose by the Tomar's folly."

69. This tradition is related in a more poetical form by Kharg Rai, who wrote in the reign of Shahjahan. According to him, the Tomar Prince was provided by the sage *Vyás* with a golden nail, or spike, 25 fingers in length, which he was told to drive into the ground. At a lucky moment, on the 13th day of the waning moon of *Vaisâkh*, in the *Samvat* year 792, or A. D. 736, when the moon was in the mansion of *Abhijit*, the spike was driven into the ground by the Raja. Then said Vyâs to the King—

"*Tum se râj kadi jaëga nahi.*
"*Yih khunti Vasug ki mâthe gadhi hai.*"

" Ne'er will thy kingdom be besped,
" The spike hath pierced Vasuki's head."

Vyâs had no sooner departed, than the incredulous Raja boldly declared his disbelief in the sage's announcement, when immediately

" *Bilan De khunti ukhârh dekhi,*
" *Tab lohu se chuchâti nikali.*"
" He saw the spike thrown on the ground,
" Blood-dropping from the serpent's wound."

The sage was recalled by the horrified king, who was directed to drive the stake into the ground a second time. Again he struck, but the spike penetrated only nineteen fingers, and remained *loose* in the ground. Once more then the sage addressed the Raja prophetically, " Like the spike (*killi*) which you have driven, your dynasty will be unstable (*dilli*), and after 'nineteen' generations it will be supplanted by the Chohans, and they by the Turkans." Bilan De then became King of *Dilli*, and with his descendants held the throne for nineteen generations, according to the number of finger's lengths which the spike had been driven into the ground.

70. What was the origin of this tradition, and at what time it first obtained currency may never perhaps be known; but I think we are justified in hazarding a guess that the long reign of the Tomar dynasty must first have led to an opinion of its durability, which would then have been naturally compared with the evident stability with which the Iron Pillar was fixed in the ground. We have an exactly parallel case in the well known saying about Rome and the Coliseum— " *Quamdiu stabit Colyseus, stabit et Roma; quando cadet Colyseus, cadet Roma;*" which the verse of Byron has rendered famous :—

" While stands the Coliseum, Rome shall stand,
When falls the Coliseum, Rome shall fall."

This indeed is the oldest form of the Indian tradition that I have been able to trace. When the Muhammadan conqueror first took possession of Delhi, he was informed that the inscription on the Iron Pillar declared that the Hindu rule would last as long as the Pillar remained standing; on hearing which, to show his contempt of the prophecy, the proud victor allowed the pillar to stand. This same story must have been told to Bishop Heber, but he has jumbled it up with his account of Firuz Shah's Pillar.* That the story which he heard must

* Journal II, 291.

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have belonged to the Iron Pillar is rendered certain by his referring it to the period of "the conquest of the country by the Musalmâns." About the same time also a similar story was heard by Major Archer,* who records that "as long as the pillar stood, so long would Hindustan flourish." At a later date, a similar story was repeated to Mrs. Colin Mackenzie,† who says that the Iron Pillar bears a Sanskrit inscription, "the purport of which is, that as long as this pillar stands, the *Râj* or kingdom has not finally departed from the Hindus." Lastly, Syad Ahmad relates that the pillar was driven into the head of *Vâsuki*, king of the snakes, to make his empire lasting.

71. If I am right in ascribing the origin of this tradition to a late period in the history of the Tomars, when the long duration of their rule had induced people to compare its stability with that of the Iron Pillar, I think that the saying may be referred with considerable probability to the prosperous reign of Anang Pâl 2nd, whose name is inscribed on the shaft with the date of *Samvat* 1109 or A. D. 1052.

72. The remaining inscriptions on the Iron Pillar are numerous, but unimportant. There are two records of the Chohan Raja *Chatra Sinha*, both dated in S. 1883, or A. D. 1826. They state that the Raja was descended from *Prithivi Raja* in 29 generations, which is quite possible, although the period allowed for each generation is under 23 years. The date of Prithivi Raja is given as S. 1151, or A. D. 1094, which is just 99 years too early, an amount of error which agrees with the false dates in the *Prithi Râj Chohan Râsa* of the Bard *Chand*. There is also another modern Nagari inscription of six lines, dated in S. 1767, or A. D. 1710, of the Bundela Rajas of *Chânderi*. Below this there are two Persian inscriptions, dated in A. H. 1060 and 1061, or A. D. 1651-52, which merely record the names of visitors.

73. The only other remains of Hindu Delhi are the numerous pillars which form the colonnades of the Court of the Great Masjid close to the Kutb Minar. The Arabic inscription over the eastern entrance of this Court-yard, states that the materials were obtained from the demolition of 27 idolatrous temples, each of which had cost the sum of 20 *lakhs* of *Dilials*. I agree with Mr. Thomas‡ that the *Dilial* must have corresponded with the original billon currency of Prithivi Raja. Now the value of the Dilial was as nearly as possible the same as that of the *Jital* or *Chital* of Ala uddin Khilji, 50 of which, as we

* I. 121. † 2nd edition, p. 46. ‡ Prinsep's Essays, I, 326.

learn from Ferishta,* were equal to one Rupee. The cost of each of these temples would not therefore have been more than Rs. 40,000, and that of the whole number, only Rs. 10,80,000, or £108,000. The cost of these temples seems excessive when expressed in such small money as *Dilials;* each coin being worth only a little more than a half-penny; but the sum is moderate enough when it is named in Rupees.

74. Mr. Fergusson† has expressed an opinion that "it is not easy to determine whether the pillars now stand as originally arranged by the Hindus, or whether they have been taken down and re-arranged by the conquerors." In this instance he thinks it "most probable that the former was the case, and that they were open colonnades surrounding the palace of Prithivi Raja;" but he presently adds that "if this is so, it is the only instance known of Hindu pillars being left undisturbed." When Mr. Fergusson formed this opinion, he was not aware of the fact recorded over the eastern gateway by the Musalmân conqueror, that the Great Masjid had been built of the materials of no less than *twenty-seven Hindu temples.* He knew only the common tradition that on this site once stood the palace and temple attributed to Prithivi Raja. On this account he may have supposed that most of these pillars must have belonged to those buildings, and therefore that they might *possibly* still be in their original positions. But evidently he had strong doubts on the subject, for he repeats his opinion that "if the pillars at Kutb are *in situ,* it is the only instance known of such being the case." In February 1853 I examined very minutely the pillared cloisters of the Great Mosque, and I then came to the conclusion, as recorded in my Note-book at the time, that "the square about the Iron Pillar is all made up; the outer walls are not Hindu; the pillars are all made up of pieces of various kinds; the shaft of one kind being placed above that of another for the purpose of obtaining height. The general effect is good; but a closer inspection reveals the incongruities of pillars, half plain and half decorated, and of others that are thicker above than below." Just ten years later in January 1863, with Mr. Fergusson's book in my hand, I re-examined the whole of these pillars with exactly the same result. Every single pillar is made up of *two* separate Hindu shafts, placed one above the other; and as these shafts

* Briggs, I, 360. † Hand-book of Architecture, I, 418.

are of many various sizes, the required height is obtained by the insertion of other pieces between the shorter shafts. In one instance in the north cloister there is a pillar made up of no less than three shafts of exactly the same pattern, piled one over the other. This may be seen in Beato's photograph of this cloister (see the 4th pillar on the left hand). The general effect of these large rows of made-up columns is certainly rich and pleasing; but this effect is due to the kindly hand of time, which has almost entirely removed the coating of plaster with which the whole of these beautifully sculptured pillars were once barbarously covered by the idol-hating Musalmâns.

75. The same doubling up of the old Hindu pillars has been followed in the cloister of the large Court of the Kutb Minar, the shaft of one plain pillar being placed over another to obtain height. A similar re-arrangement may be observed in the Court of the *Jámai* or Dina Masjid of Kanoj commonly called *Sita-ka-Rasũi*, or "Sita's kitchen."

76. The number of decorated pillars now remaining in the Court-yard of the Great Mosque around the Iron Pillar, is, as nearly as I could reckon them, 340; but as the cloisters are incomplete, the original number must have been much greater. My reckoning makes them 450. In the interior of the Great Mosque itself, there are 35 pillars now remaining, of a much larger size and of a somewhat different style of decoration. When the Mosque was complete, there must have been not less than 76 of these pillars. Of the plain pillars in the Court-yard of the Kutb Minar, I counted 376, but the total number required to complete the cloisters would be about 1,200.

77. I have given these figures in detail, for the purpose of corroborating the statement of the Musalmân conqueror, with regard to the number of temples that were standing in Dilli, at the close of the Hindu power. The usual number of columns in a Hindu temple is from 20 to 30, although a few of the larger temples may have from 50 to 60. But these are exceptional cases, and they are more than balanced by the greater number of smaller temples, which have not more than 12 or 16 pillars. The great temple of *Vishnupad* at Gaya has 50 pillars, and Mr. Fergusson mentions that a temple of 56 pillars was the most extended arrangement that he had met with under a single dome.* The magnificent temple at *Chandrâvati*, near *Jhálra Pâtan*, and the pillared temple of *Ganthai*, at *Kajraha*, have only 28 columns

* Illustrations of Indian Architecture, Introd. p. 18.

each. The *Baroli* temple has 24 columns; the great temple at *Bindraban* has only 16; and the *Chaori* in the *Mokandra Pass* has not more than 12. But there are many temples that have even fewer pillars than these, as, for instance, that of *Mâta Devi*, in Gwalior, which has only 6 pillars, and that of *Chatur Bhuja*, also in Gwalior, which has not more than 4 pillars. Taking these temples as fair specimens of many various styles and ages, the average number of pillars in a Hindu fane is between 24 and 25; or, if the extremes be omitted, the average number is 21. Accepting these numbers as a fair guide, we may set down the 76 pillars of the Great Masjid as the spoils of at least 2, but more probably of 3 temples, each equal in size to the magnificent fane at Chandrâvati. Similarly the 450 pillars of the Court of the Masjid will represent the spoils of not less than from 18 to 22 temples, of 20 and 25 columns each. These numbers added together give a total of from 20 to 25 temples, which agrees so nearly with the number recorded in the Muhammadan inscription, as to leave no doubt whatever of the truth of the conqueror's boast, that the Masjid was built of the spoils of 27 temples.

78. A curious confirmation of the average size of these temples has been afforded by a discovery which I first made in 1853, and which I completed during the present year. In the south-east corner of the cloisters of the Great Mosque, the pillars, with bases and capitals complete, are nearly all of one style and size, and quite different from the other columns. Now, the bases, shafts, and capitals of these pillars are *numbered*, the highest number discovered being 19. I found 15 numbered shafts, of which No. 13 is in the north cloister, far away from its fellows. I found also 13 numbered bases, and 7 numbered capitals; but only in one instance, that of No. 10, do the numbers of base, shaft, and capital, as they now stand, agree. Here, then, we have a direct and convincing proof that these particular pillars have all been re-arranged. The total number of shafts discovered was only 15, but they were all numbered. Of the bases, I discovered 19, of which 4 were square, and 15 had the angles recessed, like all the shafts. Of the capitals, all of one uniform pattern, I found 20, of which one was inscribed with the number 19. From all these facts I conclude, with a probability amounting almost to certainty, that the temple from which these pillars were obtained consisted of 20 columns only. On No. 12 shaft there is the word

Kachal in Nagari letters on one face, with the date of 1124 on another face, which, referred to the Vikramáditya *Samvat*, is equivalent to A. D. 1067, at which time Anang Pâl 2nd, the founder of Lâlkot, was reigning in Dilli.

79. But the mason's marks on the stones of this temple were not confined to the pillars, as I discovered them on no less than 13 different portions of its entablature. These marks are more than usually detailed, but unfortunately, in spite of their length and apparent clearness, I am still unable to make them out completely. They will be found in plate 3, along with a drawing of the pillar itself. The marks are the following:—

A.—*Chapa Vida* 3	Upper *Vida* (?) No. 3.
B.—*Chapa Vida* 4	Ditto (?) No. 4.
C.—*Pâchuki* 4	Rear (?) No. 4.
D.—*Pâchaki* 5 pachhim	Rear (?) No. 5 west.
E.—*Vi Chaothe*	*Vida* (?) fourth.
F.—*Vi panchama*	*Vida* (?) fifth.
G.—*Prathama Dáshen*	First Architrave.
H.—*Pachchhim Raki Dâshen* ...	West side Architrave.
K.—*Purab Prathama*	East first.
L.—*Purab* 3	East No. 3.
M.—*Pâchchhim Ra* 3 *A*-(ge?) ...	West side No. 3., front?
N.—*Pachchhim Raki pachchhe* ...	West side back.
O.—*Pachchhim Raki* 6 *pachchhe*	West side No. 6, back.

80. There is a peculiarity about the numbers of the pillars which is worthy of note. Each cypher is preceded by the initial letter of the word for that number. Thus, 3 is preceded by *ti* for *tin*, 10 by *da* for *das*, and 16 by *so* for *solah*. The same style of marking would appear to have been used for a second temple, as I found a pillar of another pattern with the number *du* 2, and a pilaster of the same kind with *u* 19. It is possible, however, that these two shafts may have belonged to the set of pillars just described, as they are also of sandstone. Their height is exactly the same, and the numbers are two of the five that are missing. In this case the temple would have had 4 pillars (probably an outer row) of one pattern, and 16 of another kind, but all of the same height.

81. The dimensions of these inscribed pillars are as follows:—

		Ft.	In.	Ft.	In.
Capital	Upper member, with brackets,	0	10		
	Lower ditto, ...	0	6		
				1	4
Shaft, ...				4	11½
Base	Upper portion, ornamented,...	1	2½		
	Lower ditto, plain, ...	0	9		
				1	11½
	Total height,			8	3

82. The only other Hindu remains are the two Forts of *Lâlkot* and *Rai Pithora*, which together formed the old Dilli of the Musalmâns, after the building of the new Fort of *Siri* by Ala-uddin Khilji. Of these two, the older Fort of *Lâlkot* has hitherto remained unknown, being always described by the Musalmâns as a part of the Fort of Rai Pithora. It is called *Siri* by Lieutenant Burgess, who made a survey of the ruins of Dilli in 1849-50, and the same name is given to it by Messrs. Cope and Lewis in their interesting account of Firuzabad, published in the Journal of the Archæological Society of Delhi for 1850. The reasons which induce me to identify this Fort with the *Lâlkot* of Anang Pâl have already been given when speaking of the refounding of *Dilli*, and the reasons which compel me to reject its identification with *Siri* will be detailed when I come to speak of that place.

83. The Fort of *Lâlkot*, which was built by Anang Pâl in A. D. 1060, is of an irregular rounded oblong form, 2¼ miles in circumference. Its walls are as lofty and as massive as those of *Tughlakabad*, although the blocks of stone are not so colossal. By different measurements I found the ramparts to be from 28 to 30 feet in thickness, of which the parapet is just one-half. The same thickness of parapet is also derived from the measurement given by Ibn Batuta in A. D. 1340, who says that the walls were *eleven* cubits thick. Accepting this measure as the same that was in use in Firuz Shah's time, namely, of 16 inches, as derived from the length of Firuz Shah's pillar, the thickness of the walls of old Dilli was 14¼ feet. These massive ramparts have a general height of 60 feet above the bottom of the ditch, which

still exists in very fair order all round the Fort, except on the south side, where there is a deep and extensive hollow that was most probably once filled with water. About one-half of the main walls are still standing as firm and as solid as when they were first built. At all the salient points there are large bastions from 60 to 100 feet in diameter. Two of the largest of these, which are on the north side, are called the *Fateh Burj* and the *Sohan Burj*. The long lines of wall between these bastions are broken by numbers of smaller towers well splayed out at the base, and 45 feet in diameter at top, with curtains of 80 feet between them. Along the base of these towers, which are still 30 feet in height, there is an outer line of wall forming a *raoni* or faussebraie, which is also 30 feet in height. The parapet of this wall has entirely disappeared, and the wall itself is so much broken, as to afford an easy descent into the ditch in many places. The upper portion of the counterscarp walls has nearly all fallen down, excepting on the north-west side, where there is a double line of works strengthened by detached bastions.

84. The positions of three of the gateways in the west half of the Fort are easily recognized; but the walls of the eastern half are so much broken, that it is now only possible to guess at the probable position of one other gate. The north gate is judiciously placed in the re-entering angle close to the Sohan Burj, where it still forms a deep gap in the lofty mass of rampart, by which the cowherds enter with their cattle. The west gate is the only one of which any portion of the walls now remains. It is said to have been called the *Ranjit* gate. This gateway was 17 feet wide, and there is still standing on the left-hand side a large upright stone, with a groove for guiding the ascent and the descent of a portcullis. This stone is 7 feet in height above the rubbish, but it is probably not less than 12 or 15 feet. It is 2 feet 1 inch broad and 1 foot 3 inches thick. The approach to this gate is guarded by no less than three small out-works. The south gate is in the southmost angle near Adan Khan's tomb. It is now a mere gap in the mass of rampart. On the south-east side, there must, I think, have been a gate near Sir Thomas Metcalfe's house, leading towards Tughlakabad and Mathura.

85. Syad Ahmad states, on the authority of Zia Barni, that the west gate of Rai Pithora's Fort was called the *Ghazni* gate after the Musalmân conquest, because the *Ghazni* troops had gained the fortress

by that entrance. I feel satisfied that this must be the *Ranjit* gate of Lâlkot for the following reasons:—

1st.—The Musalmâns never make any mention of Lâlkot, but always include it as a part of Rai Pithora's Fort.

2nd.—The possession of the larger and weaker fortress of Rai Pithora could not be called the conquest of Delhi, while the stronger citadel of Lâlkot still held out.

3rd.—The evident care with which the approach to the *Ranjit* gate has been strengthened by a double line of works, and by three separate out-works immediately in front of the gateway itself, shows that this must have been considered as the weakest point of the fortress, and therefore that it was the most likely to have been attacked. For this reason I conclude that the *Ranjit* gate was the one by which the Musalmâns entered Lâlkot, the citadel of Dilli, and that, having proved its weakness by their own success, they at once proceeded to strengthen the works at this point for their own security. A case exactly similar occurred less than forty years afterwards, when the Emperor Altamish, having gained an entrance into the fortress of Gwalior by the deep ravine on the west side called *Urwâhi*, immediately closed it by a massive wall, to prevent his enemies from taking advantage of the same weak point. I believe that the western gate was called the Ghazni gate for the simple reason only that Ghazni lies to the west of Delhi.

86. The Fort of Rai Pithora, which surrounds the citadel of Lâlkot on three sides, would appear to have been built to protect the Hindu city of *Dilli* from the attacks of the Musalmâns. As early as A. D. 1100, the descendants of Mahmud, retiring from Ghazni before the rising power of the Saljukis, had fixed their new capital at Lahore, although Ghazni still belonged to their kingdom, and was occasionally the seat of Government. But a new and more formidable enemy soon appeared, when the celebrated Muäz-uddin Sâm, commonly called Muhammad Ghori, after capturing the cities of Multan and Peshâwar, appeared before Lahore in A. D. 1180, and put an end to the Ghaznavide dynasty by the capture of their capital in A. D. 1186. The danger was now imminent, and only 5 years later, in A. D. 1191, we find the Ghori King in full march on Ajmere. But the Raja of Dilli was well prepared for this invasion, and, with the aid of his allies, he defeated the Musalmâns, with great slaughter, at *Tilaori*, midway

between Karnâl and Thanesar. As the first appearance of the formidable Ghoris before Lahore corresponds so nearly with the accession of Prithivi Raja, I think it very probable that the fortification of the city of Dilli was forced upon the Raja by a well-grounded apprehension that Dilli itself might soon be attacked; and so it happened, for within two years after the battle of *Tilaori*, the Raja was a prisoner, and Dilli was in the possession of the Musalmâns.

87. The circuit of Rai Pithora's Fort is 4 miles and 3 furlongs, or just three times as much as that of *Lâlkot*. But the defences of the city are in every way inferior to those of the citadel. The walls are one half the height, and the towers are placed at much longer intervals. The wall of the city is carried from the north bastion of Lâlkot, called *Fateh Burj*, to the north-east for three quarters of a mile, where it turns to the south-east for 1½ miles to the *Damdama Burj*. From this bastion the direction of the wall for about 1 mile is south-west, and then north-west for a short distance to the south end of the hill on which Azim Khan's tomb is situated. Beyond this point the wall can be traced for some distance to the south along the ridge which was most probably connected with the south-east corner of Lâlkot., somewhere in the neighbourhood of Sir T. Metcalfe's house.

88. The Fort of Rai Pithora is said to have had 9 gates besides the Ghazni gate. Four of these gates can still be traced; the 1st is on the west side, and is covered by an out-work; the 2nd is on the north side, towards Indrpat; the 3rd is on the east side, towards Tughlakabad; and the 4th is on the south-east side. But besides these there must have been other gates somewhere on the south side, one of which could not have been far from Sir T. Metcalfe's house. Such was the Hindu city of Dilli when it was captured by the Musalmâns in January 1193. The circuit of its walls was nearly 4½ miles, and it covered a space of ground equal to one-half of the modern Shahjahânâbâd, the Capital of the Mogul Sovereigns of India. It possessed 27 Hindu temples, of which several hundreds of richly carved pillars remain to attest both the taste and the wealth of the last Hindu Rulers of Dilli.

Muhammadan Remains.

89. The first Musalmân Sovereigns of Delhi are said to have remained content with the fortress of Rai Pithora, although it seems highly probable that they must have added to the defences of the west

gate, by which they had entered Lâlkot, the citadal of the Hindu Kings. But though the first Musalmân Kings did not build huge forts or extensive cities to perpetuate their names, yet in the Great Mosque and magnificent column of Kutb-uddin Aibeg, as well as in the richly carved tomb of Altamish, they have left behind them a few wonderful works, which are in every way more worthy of our admiration.

90. The Great Mosque of Kutb-uddin was called the *Jâma Masjid*, according to the inscription over the inner archway of the east entrance. But it is now more commonly known as the *Masjid-i-Kutb-ul Islâm*, or the "Mosque of the Pole Star of Islamism," a name which appears to preserve that of its founder. It seems probable, however, that the Kutb Mosque, as well as the *Minar*, may have been named after the contemporary Saint *Kutb-uddin Ushi*, whose tomb is close by; Syad Ahmad adds that the Mosque was also called the Adina Masjid. This Great Mosque, which even in ruin is one of the most magnificent works in the world, was seen by Ibn Batuta* about 150 years after its erection, when he describes it as having no equal, either for beauty or extent. In the time of Timur, the people of old Delhi prepared to defend the Great Mosque, but they were all, according to the Muhammadan Historian Sharif-uddin, despatched by the sword "to the deepest hell." The Mosque is not mentioned by Baber, although he notices the Minar and the tomb of Khwaja Kutb-uddin, which he perambulated.† It is not mentioned either by Abul Fazl; but no inference can be drawn from his silence, as he does not even allude to the Kutb Minar. The Minar itself was repaired during the reign of Sikandar Lodi; but we hear nothing of the Great Mosque, from which, perhaps, it may be inferred either that it was still in good order, or that it was too much ruined to be easily repaired. I conclude that the latter was the case, as it seems probable that the permanent removal of the Court from Delhi to Firuzabad must have led to the gradual abandonment of the old city. We have a paralled case in the removal of the Hindu Court from Kanoj to Bâri in the time of Mahmud of Ghazni. This removal took place in A. D. 1022 and in A. D. 1031, or within ten years, Abu Rihan records that Kanoj having been deserted by its ruler, "fell to ruin."

91. The Great Mosque of Kutb-uddin was begun immediately after the capture of Delhi in A. H. 589, or A. D. 1193, as recorded by the

* Travels, p. 111. † Memoirs, p. 308.

King himself, in the long inscription over the inner archway of the east entrance. The date is given by Syad Ahmad as 587, but this difference in the unit has been caused by his own omission of the two points of the initial letter of the word *Tisa*, تسع, or nine, instead of *Saba*, سبع, or "seven," as he has got it. In this inscription, as well as in the shorter one over the outer archway of the same gate, Kutb-uddin refrains from calling himself by the title of Sultan, which he bestows on his Suzerain Muäz-uddin in the inscription over the north gateway. This last inscription is dated in A. H. 592. And here again I have to notice the omission of two points in the Syad's copy of the second number of the date. In my copy, which was taken in 1839, I find the word تسعين, *tisaïn*, or "ninety," quite complete. In this inscription it is recorded that the foundation of the Masjid was laid in the reign of the Sultan *Muäz-uddin Muhammad, bin Sám* (in the time of the Khalif) *Naser*, Chief of the Faithful. The date of A. H. 592, or A. D. 1196, must therefore I think, be referred to the completion of the building. It is true that three years may seem but a short time for the completion of this large Mosque, yet, when we remember that the whole of the stones were obtained ready squared from the Hindu temples on the spot, our wonder will cease, and any doubts that might have arisen in our minds will be dissipated at once.

92. The *Jâma Masjid* is not so large as many buildings of the same kind that have been raised in later years, such as the great Mosques of Jonpur and others; but it is still unrivalled for its grand line of gigantic arches, and for the graceful beauty of the flowered tracery which covers its walls. The front of the Masjid is a wall 8 feet thick, pierced by a line of seven noble arches. The centre arch is 22 feet wide and nearly 53 feet in height, and the side arches are 10 feet wide and 24 feet high. Through these gigantic arches the first Musalmâns of Delhi entered a magnificent room 135 feet long and 31 feet broad, the roof of which was supported on five rows of the tallest and finest of the Hindu pillars. The Mosque is approached through a cloistered court, 145 feet in length from east to west, and 96 feet in width. In the midst of the west half of this court, stands the celebrated Iron Pillar, surrounded by cloisters formed of several rows of Hindu columns of infinite variety of design, and of most delicate execution. There are three entrances to the court of the Masjid, each 10 feet in width, of which the eastern entrance was the

principal one. The southern entrance has disappeared long ago, but the other two are still in good order, with their interesting inscriptions in large Arabic letters.

93. I have already noticed that the whole of the beautiful Hindu pillars in these cloisters were originally covered with plaster by the idol-hating Musalmâns as the readiest way of removing the infidel images from the view of true believers. A further proof of this may be seen on two stones in the north side of the court, one fixed in the inner wall in the north-east angle just above the pillars, and the other in the outer wall between the north gate and the north-east corner. The inner sculpture represents several well known Hindu gods,—1st, *Vishnu* lying on a couch with a lotus rising from his navel, and covered by a canopy, with two attendants, one standing at his head and one sitting at his feet; 2nd, a seated figure not recognized; 3rd, *Indra* on his elephant; 4th, *Brahma* with three *heads* seated on his goose; 5th, *Siva*, with his trident seated on his bull *nandi;* 6th, a figure with lotus seated on some animal not recognized. The outer sculpture is of a different description. The scene shows two rooms with a half-opened door between them. In each room there is a female lying on a couch with a child by her side, a canopy over her head, and an attendant at her feet. In the left-hand room two females are seen carrying children towards the door, and in the right-hand room, two others are doing the same. The whole four of these females appear to be hastening towards the principal figure in the right-hand room. I am unable to offer any explanation of this very curious scene. But as it is quite certain that these figures could not have been exposed to the sight of the early Musalmâns, I conclude that these stones must also have been carefully plastered over.

94. During the reign of Altamish, the son-in-law of Kutb-uddin, the Great Mosque was much enlarged by the addition of two wings to the north and south, and by the erection of a new cloistered court six times as large as the first court. The fronts of the two wing buildings are pierced by five arches each, the middle arches being 24 feet span, the next arches 13 feet, and the outer arches only 8½ feet. The walls are of the same thickness, and their ornamental scrolls are of the same delicate and elaborate tracery as those of the original Mosque. But though the same character is thus preserved in these new buildings, it would seem that they were not intended simply as

additions to the Jâma Masjid, but as new and separate Mosques. I infer this from the existence of a large niche in the middle of the rear wall of the north wing, which, as far as my observation goes, is the usual mode of construction for the middle of the back wall of every large Mosque. The whole front of the Jâma Masjid, with its new additions, is 384 feet in length, which is also the length of its cloistered court. The wall on the south side of the court, as well as the south end of the east wall, are fortunately in good preservation, and, as about three-fourths of the columns are still standing, we are able to measure the size of the enclosure with precision, and to reckon the number of columns with tolerable certainty. The number of columns must have been as nearly as possible 600, and as each of them consists of two Hindu shafts, the whole number of Hindu pillars thus brought into use could not have been less than 1,200. By my measurements the court is a square of 362 feet inside the walls, of which the west wall, which is the front of the Masjid, is only 8 feet thick, the other walls being 11 feet thick. The whole area covered by the Masjid and its court is therefore 420 feet by 384 feet; and exactly in the middle of the south side of this great quadrangle stands the majestic column called *Kutb Minar*, within 11 feet of the line of cloister pillars.

95. During the present century, much speculation has been wasted as to the origin of the Kutb Minar, whether it is a purely Muhammadan building, or a Hindu building altered and completed by the conquerors. The latter is undoubtedly the common belief of the people, who say that the pillar was built by Rai Pithora for the purpose of giving his daughter a view of the River Jumna. Some people even say that the intention was to obtain a view of the Ganges, and that, the Kutb Minar having failed to secure this, a second pillar of double the size was commenced, but the work was interrupted by the conquest of the Musalmâns. The first part of this tradition was warmly adopted by Sir T. Metcalfe, and it has since found a strong advocate in Syad Ahmad, whose remarks are quoted with approval by Mr. Cooper in his recent hand-book for Delhi. Syad Ahmad, however, refers only the basement story to Rai Pithora; but this admission involves the whole design of the column, which preserves the same marked character throughout all the different stories. The Hindu theory has found a stout opponent in Colonel Sleeman, who argues that the great slope of the building "is the peculiar characteristic of

all architecture of the Pathans," and that the arches of the Great Mosque close by it " all correspond in design, proportion, and execution to the tower."

96. Mr. Cooper* recapitulates Syad Ahmad's arguments, and finally states as his opinion that it " remains an open question whether this magnificent pillar was commenced by the Hindus or Muhammadans." I must confess, however, that I am myself quite satisfied that the building is entirely a Muhammadan one, both as to origin and to design; although, no doubt, many, perhaps all, of the beautiful details of the richly decorated balconies may be Hindu. To me these decorations seem to be purely Hindu, and just such as may be seen in the honeycomb enrichments of the domes of most of the old Hindu temples. The arguments brought forward in support of the Hindu origin of the column are the following :—

97. 1st.—" That there is only *one Minar*, which is contrary to the practice of the Muhammadans, who always give two Minars to their Masjids." I allow that this has been the practice of the Muhammadans for the last three hundred years at least, and I will even admit that the little corner turrets or pinnacles of the *Kala*, or *Kalân*, *Masjid* of Firuz Shah, may be looked upon as Minars. This would extend the period of the use of two Minars to the middle of the 14th century; but it must be remembered that these little turrets of Firuz Shah's Masjid are not what the Musalmâns called *Mazinahs*, or lofty towers, from the top of which the Muazzin calls the faithful to prayer. But the Kutb Minar is a *Mazinah;* and that it was the practice of the early Muhammadans to build a single tower, we have the most distinct and satisfactory proofs in the two Minars of Ghazni, which could not have belonged to one Masjid, as they are half a mile apart, and of different sizes. These Minars were built by Mahmud in the early part of the 11th century, or about 180 years prior to the erection of the Kutb Minar. Another equally decisive proof of this practice is the solitary Minar at Koel, which was built in A. H. 652, or A. D. 1254, by *Kutlugh Khan* during the reign of Nasiruddin Mahmud, the youngest son of Altamish, in whose time the Kutb Minar itself was completed. These still existing Minars of Ghazni and Koel show that it was the practice of the early Muhammadans to

* Hand-book for Delhi, p. 73.

have only one Minar even down to so late a date as the middle of the 13th century.

98. 2nd.—It is objected that the slope of the Kutb Minar is much greater than that of any other known Minars. This objection has already been satisfactorily answered by Colonel Sleeman, who says truly that "the slope is the peculiar characteristic of the architecture of the Pathans."

99. 3rd.—Syad Ahmad agrees that, if the Minar had been intended as a *Mazinah* to the Great Mosque, it would have been erected at one end of it, instead of being at some distance from it. In reply to this objection I can point again to the Koel Minar, which occupies exactly the same detached position with regard to the Jâma Masjid of Koel as the Kutb Minar does with respect to the Great Mosque of Delhi. Both of them are placed outside the south-east corner of their respective Masjids. This coincidence of position seems to me sufficient to settle the question in favour of the Kutb Minar having been intended as a Mazinah of the Great Mosque.

100. 4th.—Syad Ahmad further argues "that the entrance door faces the north, as the Hindus always have it," whereas the Muhammadans invariably place it to the eastward, as may be seen in the unfinished "Minar of Ala-uddin to the north of the Kutb Minar." Once more I appeal to the Koel Minar, which, be it remembered, was erected by the son of the Emperor who completed the building of the Kutb Minar, and which may therefore be looked upon as an almost contemporary work. In the Koel Minar the entrance door is to the north, exactly as in the Kutb Minar. In both instances, I believe that it was so placed chiefly for the convenience of the Muazzin when going to call the faithful to prayer. I think, also, that Syad Ahmad has overlooked the fact that the Minars of modern days are "engaged" towers, that is, they form the ends of the front wall of the Mosque, and, as the back wall of every Mosque is to the westward, the entrances to the "engaged" Minars must necessarily be to the eastward. But the case is entirely different with a solitary disengaged Minar of which the entrance would naturally be on the side *nearest* to its Masjid. But waiving this part of the discussion, I return to the fact that the entrance of the Koel Minar is to the northward exactly the same as in the Kutb Minar, and that the entrances to the two great tombs of *Bahâwal Hak* and *Rukn-uddin* in Multan are not

to the eastward but to the southward, as are also those of the Taj Mahal, and of most other modern tombs. The only exception that I know is the tomb of Altamish, of which the entrance is to the eastward. The argument of Syad Ahmad includes also the position of the entrance doors of Hindu buildings, which, as he says, are always placed to the northward. But this is an undoubted mistake, as a very great majority of Hindu temples have their entrances to the eastward. On referring to my note-books, I find that, out of 50 temples, of which I have a record, no less than 38 have their entrances to the east, 10 to the west, and only 2 to the north, both of which last are in the Fort of Gwalior.

101. 4th.—Syad Ahmad further objects that "it is customary for the Hindus to commence such buildings without any platform (or plinth), whereas the Muhammadans always erect their buildings upon a raised terrace or platform, as may be seen in the unfinished Minar of Ala-uddin Khilji." In this statement about the Hindu buildings, Syad Ahmad is again mistaken, as it is most undoubtedly the usual custom of the Hindus to raise their temples on plinths. I can point to the gigantic Buddhist temple at Buddha Gaya as springing from a plinth nearly 20 feet in height. The two largest temples in the Fort of Gwalior, one Brahmanical and the other Jain, are both raised on plinths, so also are the elaborately sculptured temples of Kajrâha, and so are most of the temples in Kashmir. Lastly, the Great Pillar at Chitor has a plinth not less than 8 or 10 feet in height, as may be seen in Fergusson's and Tod's Drawings, and which Tod* describes as "an ample terrace 42 feet square." The smaller pillar at Chitor must also have a good plinth, as Fergusson describes the entrance as at some height above the base. That the Muhammadans in India also erect their buildings on plinths or raised terraces, I readily admit; for, on the same principle that a cuckoo may be said to build a nest, the Musalmâns usually placed their buildings on the sites of Hindu temples which they had previously destroyed. The Mosques at Mathura, Kanoj, and Jonpur, are signal examples of this practice. The raised terrace is therefore only an accidental adjunct of the Muhammadan building, whereas it is a fundamental part of the Hindu structure. But the early Musalmâns did *not* place their buildings on raised terraces or platforms, as may be seen by a reference to the drawings of Mosques in Syria and Persia, which are given in Fergusson's Hand-book.† The Ghaznivides also, who were the more

* Rajasthan, II. 761.

† Vol. I., p. 415.

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immediate predecessors of the Indian Musalmâns, built their Minars at Ghazni without plinths. The contemporary tomb of Altamish is likewise without a plinth. From all these facts I infer that the early Musalmân structures in India were usually built without plinths, and therefore that the Kutb Minar is undoubtedly a Muhammadan building.

102. 5th.—The last argument brought forward by Syad Ahmad is, that bells, which are used in Hindu worship, are found sculptured on the lower part of the basement story of the Kutb Minar. It is true that bells are used in the daily worship of the Hindus, and also that they are a common ornament of Hindu columns, as may be seen on most of the pillars in the cloisters of the Great Mosque. But bells are no more idolatrous than flowers, which are used in such profusion in the daily service of the Hindu temples. The fact is, that, where Muhammadan Mosques have been built of the materials stolen from Hindu Temples, such portions of architectural ornament as were free from figures either of men or of animals, were invariably made use of by the conquerors. For this reason most of the ornamentation of the early Musalmân buildings is purely Hindu. For instance, in the Jâma Masjid of Kanoj, which is built entirely of Hindu materials, the whole of the concentric circles of overlapping stones in the central dome, with only one exception, still preserve the original Hindu ornament unaltered. The exception is the lowest circle, which is completely covered with Arabic inscriptions. One of the Hindu circles is made up solely of the *Swastika* or mystic cross of the early Indians. This symbol is essentially an idolatrous one, although it is most probable that the Musalmâns were not aware of its significance. But if the ornamental bells of the Kutb Minar are to be taken as a proof of its Hindu origin, even so must the ornamental *Swastikas* of the Kanoj Masjid be accepted as evidence to the same effect. It is admitted that this Masjid is built up entirely of Hindu materials, but these have been skilfully re-arranged by the Moslem Architect to suit the requirements of a Mosque, so that the design of the building is strictly Muhammadan, while its ornamentation is purely Hindu. I may add that one of the western pillars that supports the central dome of this Mosque is made up of two old shafts, both of which are decorated with the Hindu bell and suspending chain.

103. The strong evidence which I have brought forward in reply to the arguments of Syad Ahmad and others, appears to me to be quite conclusive as to the origin of the Kutb Minar, which is essentially a Muhammadan building. But the strongest evidence in favour of this conclusion is the fact that the Musalmâns of Ghazni had already built two separate Minars of *similar design*, whereas the only Hindu pillar of an early date, namely, the smaller column at Chitor, is altogether dissimilar, both in plan and in detail. The entrance to this Hindu tower is at some height above the ground, while that of the Kutb Minar is absolutely on the ground level. The summit of the Hindu tower is crowned by an open pillared temple of almost the same width as the base of the building, whereas the cupola of the Kutb Minar is little more than one-sixth of the diameter of its base. But this small cupola of less than 9 feet in diameter was peculiarly adapted for one special purpose connected with the performance of the Muhammadan religion. From this narrow point the Muazzin could summon the faithful to prayer from all sides by simply turning round and repeating the *Izan*, and on all sides he would be visible to the people. The small size of the cupola which crowns the Kutb Minar, is a characteristic peculiar to Muhammadan towers for the special reason which I have just mentioned. On this account, therefore, I conclude that the Kutb Minar is a *Mazinah* or Muazzin's tower.

104. That the Kutb Minar was actually used as a *Mazinah*, we may infer from the records of Shamsi Sirâj, who, about A. D. 1380, records that the magnificent Minar in the Jâma Masjid of old Delhi was built by Sultan Shams-uddin Altamish. But the fact is placed beyond all doubt by Abulfeda, who wrote about A. D. 1300. He describes the *Mazinah* of the Jâma Masjid at Delhi as made of red stone and very lofty, with many sides and 360 steps.

Now this description can be applied only to the Kutb Minar, which, as it at present stands, has actually 379 steps; but we know that the Minar was struck by lightning in the reign of Firuz Shah, by whose orders it was repaired in A. D. 1368. There is therefore nothing improbable in the account of Abulfeda that the Minar in his time had only 360 steps. On the contrary, I accept the statement as a valuable hint towards ascertaining the height of the original Minar as completed by the Emperor Altamish.

105. The object of building this lofty column seems to me to be clear enough. The first Musalmân conquerors were an energetic race, whose conceptions were as bold and daring as their actions. When the zealous Muhammadan looked on the great city of Delhi, the metropolis of the princely Tomars and the haughty Chohans, his first wish would have been to humble the pride of the infidel; his second, to exalt the religion of his prophet Muhammad. To attain both of these objects, he built a lofty column, from whose summit the *Muazzin's* call to morning and evening prayer could be heard on all sides by Hindus as well as by Musalmâns. The conqueror's pride was soothed by the daily insult and indignity thus offered to the infidel, while his religious feelings were gratified by the erection of a noble monument which towered majestically over the loftiest houses in the city.

106. The Kutb Minar as it stands now is 238 feet and 1 inch in height, with a base diameter of 47 feet 3 inches, and an upper diameter of nearly 9 feet. The base or plinth of the pillar is 2 feet in height, the shaft is 234 feet and 1 inch, and the base or stump of the old cupola is 2 feet more; thus making the whole height 238 feet 1 inch. The shaft is divided into five stories, of which the lower story is 94 feet 11 inches in height, and the upper story is 22 feet 4 inches, the two measurements together being just equal to one-half of the height of the column. The height of the second story is 50 feet 8½ inches, that of the third story is 40 feet 9½ inches, and that of the fourth story is 25 feet 4 inches, or just one-half of the height of the second story. There are two other proportions which may be noticed, as they most probably entered into the original design of the building. The column, as it stands now, omitting only the stump of the old cupola, is just five diameters in height; thus, 47 feet 3 inches, multiplied by 5, gives 236 feet 3 inches as the height of the column, which is only 2 inches in excess of the mean measurement. Again, the lower story is just two diameters in height. Both of these proportions were, I presume, intentional. But there is another coincidence of measurements, which is, I think, too curious to have been intentional, namely, that the circumference of the base is equal to the sum of the diameters of the six stories of the building, the old cupola being considered as a sixth story.

107. As some of the dimensions here given differ from those recorded by Ensign Blunt in the Asiatic Researches, it is necessary that I

should state that they are the mean results of two sets of measurements, the first taken by myself in 1839, and the other by Sir Frederick Abbott in 1846. I now give these measurements in detail for comparison:—

	A. D. 1839.	A. D. 1846.	Mean.	Blunt.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Upper story ...	21 10	22 10	22 4	
4th story ...	25 4	25 4	25 4	23 0
3rd „ ...	40 9	40 10	40 9½	40 0
2nd „ ...	50 10	50 7	50 8½	50 0
Basement story ...	95 3	94 7	94 11	90 0
	234 0	234 2	234 1	
Plinth ...	2 0	2 0	2 0	
	236 0	236 2	236 1	
Stump of old cupola ...	2 0	2 0	2 0	
Total present height...	238 0	238 2	238 1	242 6

The only way in which I can account for the great difference of 5 feet in the height of the lower story between Blunt's measurements taken in 1794 and the actual height as it now stands, is by supposing that there must have been an accumulation of rubbish at the foot of the tower which would have diminished the actual height of the basement story. His heights of the second and third stories agree very closely with my measurements, but that of the fourth story is more than 2 feet short of the true height. The height of the fifth story is not given.

108. In recording Blunt's measurements Mr. Fergusson has, I think, made a mistake in excluding the cupola from the ascertained height of 242 feet 6 inches. Blunt distinctly states that the height of the third story was 180 feet, which, deducted from 242½ will give no less than 62½ feet for the height of the two upper stories. But this height, as we know from present measurements, is only 25 feet 4 inches, plus 22 feet 4 inches, or altogether 47 feet 8 inches, which deducted from 62½ feet leaves 14 feet 10 inches unaccounted for. I conclude, therefore, that this must have been the height of the cupola as it stood in A. D. 1794. Accepting this view as correct, the true

height of the Kutb Minar in 1794 must have been 236 feet 1 inch, plus 14 feet 10 inches, or 250 feet 11 inches.

109. The base or plinth of the Kutb Minar is a polygon of 24 sides, each side measuring 6 feet 1½ inches, or altogether 147 feet. The basement story has the same number of faces formed into convex flutes, which are alternately angular and semi-circular. This last fact alone is sufficient to show the inaccuracy of Blunt's description of the plan as a polygon of 27 sides,* as any uneven number of faces would have brought two flutes of the same kind together. In the second story the flutes are all semi-circular, and in the third story they are all angular. The fourth story is circular and plain, and the fifth story is partially fluted with convex semi-circular flutes. Round the top of each story runs a bold projecting balcony, which is richly and elaborately decorated. The three lower stories are also ornamented with belts of Arabic writing, bordered with richly decorated bands. These three stories are built entirely of red sandstone, but there is a difference in the colours of the stone, that of the second story being generally a pale pinkish buff, while that of the third story is a dark red. The whole of the upper part of the fourth story is built of white marble, and there are also two ornamental bands of white marble in the fifth story. According to Ibn Batuta,† the pillar was said to have been built "of stones from *seven* different quarries;" but I could not trace more than *three* different kinds of stone, viz., the grey quartzose rock of Delhi, the white marble of Jaipur, and the red sandstone of the hills to the south of Delhi. If, however, the different colours of the sand-stone be taken into account, there are certainly three distinct colours, or buff, pink, and red, which may be considered as forming three distinct varieties of sand-stone. The grey quartzose stone is used only in the interior of the building, and the white marble is confined to the two upper stories. Inside the pillar there is a spiral stair-case of 376 steps from the ground level to the balcony of the fifth story. Above this, there are three steps more to the present top of the stone-work, which once formed the floor of the paltry pavilion which Major Robert Smith was allowed to stick on the top of this noble column.

110. In 1794, when Ensign Blunt sketched the Kutb Minar, the

* Asiatic Researches of Bengal, IV., 324.
† Travels—p. 111.

old cupola of Firuz Shah was still standing, although much ruined. Blunt's rude Sketch, as given in the Asiatic Researches, conveys no intelligible idea of the old cupola, and is sarcastically compared by Robert Smith to "a large stone harp." A better idea of the old cupola will be formed from an aquatint view of the pillar given in Blagdon's "Brief History of India," which was published about 18—. By comparing this view with the statement of the Natives that the old cupola was a "plain square top on four stone pillars,"* I think that it would be quite possible to restore the upper part of the pillar in a style that would harmonize with the rest of the building. It is difficult, indeed, to conceive anything more incongruous than the flimsy Mogul pavilion, which Robert Smith fixed on the "top of this grand and massive specimen of Pathân architecture." In my Note-book of 1839, I find a remark that "the balustrades of the balconies and the plain slight building on the top of the pillar do not harmonize with the massive and richly ornamented Pathân architecture." Major Smith's pavilion was taken down in 1847 or 1848 by order of Lord Hardinge. I presume that this was done at the suggestion of his eldest son, the present Lord Hardinge, whose known artistic taste and skill would at once have detected the architectural unfitness of such a flimsy pavilion for the summit of this noble column.

111. On the 1st August 1803, the old cupola of the Kutb Minar was thrown down, and the whole pillar seriously injured by an earthquake. A drawing of the pillar while it was in this state was made by Captain Elliot upwards of two years after the earthquake, but the engraving of this drawing is too small to show the nature of the balustrades of the balconies. About this time the dangerous state of the pillar was brought to the notice of the Governor-General, who authorized the necessary repairs to be begun at once. This difficult work was entrusted to Major Robert Smith, of the Engineers, and was completed by the beginning of the year 1828, at a cost of Rs. 17,000, with a further charge of more than Rs. 5,000 for clearing the ruins around the pillar. The intricate nature of some of these repairs can be best seen and understood by an examination of Mallitte's large photograph of the lower balcony. All the forms of the mouldings have been carefully preserved, but the rich ornamentation has been

* Robert Smith's Report in Journal, Archæological Society of Delhi.

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omitted as too costly, and the new stone-work is therefore quite plain throughout. This part of the work appears to have been done with much patience and skill, and Major Smith deserves credit for the conscientious care which he bestowed upon it. But this commendation must be confined to the *repairs*, for the *restorations* of the entrance door-way, of the balustrades, and of the cupola, are altogether out of keeping with the rest of the pillar.

112. It appears from Major Smith's Report that the old entrance doorway was still in existence at that time, although much broken. This being the case, he should have adhered strictly to the original design, instead of which, to use his own words, "the former rude and fractured entrance door of the base of the column (was) repaired, and *improved with new mouldings, frieze*, and repair of the inscription tablet." From this statement I infer that the whole of the entrance doorway is Smith's own design, a conclusion which has already been drawn by Mr. Fergusson, who denounces this work as being "in the true style of Strawberry Hill Gothic." Perhaps it may not now be possible to recover the original design, but its main features may be ascertained from the other three existing doorways. All of these are plain, and it is evident from Major Smith's account that the lower doorway was also plain, or, as he calls it, "rude," and without frieze or mouldings, which were added by himself. I confess, therefore, that I should like to see Smith's doorway altogether removed, and the old entrance restored in the simple but massive style of the other doorways. The entrance of the Koël Minar, which is still in existence, is also plain, and might be studied with advantage.

113. The flimsy balustrades are even a greater eye-sore than the modern entrance, as they form a prominent part in every view of the building. But although not ornamental, they are useful, and might on that account alone be tolerated. It would not, however, be either difficult or expensive to remove them, and to furnish new balustrades more in harmony with the rich style of the balconies. Ensign Blunt describes the old balustrades as "small battlements;" and such, I believe, must have been the nature of the original balustrades, at once rich and massive, like the battlements of the older tombs. The present balustrades might be sold with advantage in Delhi, as they belong to the flimsy style of garden-house architecture of the present day.

114. The history of the Kutb Minar is written in its inscriptions. In the basement story there are six bands or belts of inscriptions encircling the tower. The uppermost band contains only some verses from the Koran, and the next below it gives the well known ninety-nine Arabic names of the Almighty. The third belt contains the name and praises of *Mauz-uddin, Abul Muzafar, Muhammad Bin Sâm.* The fourth belt contains only a verse from the Koran, and the fifth belt repeats the name and praises of the Sultan Muhammad Bin Sâm. The lowermost belt has been too much injured, both by time and by ignorant restorations, to admit of being read, but Syad Ahmad has traced the words "*Amir-ul-Umra,*" or Chief of the "Nobles." The inscription over the entrance doorway records that "this Minar of Sultan Shams-uddin Altamish having been injured, was repaired during the reign of Sikander Shah, son of Bahlol, by Fatah Khan, the son of Khawâs Khan, in A. H. 909," or A. D. 1503.

115. In the second story the inscription over the doorway records that the Emperor Altamish ordered the completion of the Minar. The lowermost belt contains the verses of the Koran respecting the summons to prayers on Friday, and the upper line contains the praises of the Emperor Altamish. Over the door of the third story the praises of Altamish are repeated, and again in the belt of inscription round the column. In the fourth story the door inscription records that the Minar was ordered to be erected during the reign of Altamish. The inscription over the door of the fifth story states that the Minar having been injured by lightning, was repaired by the Emperor Firuz Shah in A. H. 770 or A. D. 1368.

116. But besides these long inscriptions, which form part of the architectural ornament of the pillar, there are a few other short records which are worth preserving. On the basement story is recorded the name of Fazzil, son of Abul Muâli, the *Mutawali* or high priest; and on one side of the third story is found the name of *Muhammad Amircho*, Architect. On the same story, also, there is a short Nâgari inscription in one line with the name of *Muhammad Sultan* and the date of Samvat 1382, or A. D. 1325, which was the first year of Muhammad Tughlak's reign. On the wall of the fourth story there is another Nâgari inscription, in two lines, which is dated in the *Samvat* year 1425, or A. D. 1368, in the reign of *Piroj Sáh*, or Firuz Shah Tughlak. A third Nâgari inscription is found on the

south jamb of the doorway of the fourth story, cut partly on the white marble and partly on the red sand-stone. This also gives the name of Firuz Shah, but the date is one year later than the last, or Samvat 1426. This is the longest and most important of the Nâgari inscriptions, but unfortunately it is not in such a state of preservation, —more especially the upper portion on the white marble,—as to be easily legible. I can make out the words *Sri Viswakarma prasâde rachita*, and towards the end I find the title of *Silpi*, or "Architect," applied to the son of *Châhada Deva Pâla*, named *Nana Salha*, who repaired the Minar. But in the middle of the inscription I find no less than five numbers given in figures, all of which are preceded by the word *gaj*, as *gaj* 22, *gaj* 3, *gaj* 26, *gaj* 131, and *gaj* 134. I infer from these measurements that the inscription may probably be of some importance in determining the nature and extent of the repairs that were executed by Firuz Shah. As I read one passage of this inscription, the Architect was obliged to pull down *(nipatit)* a considerable portion of the pillar.

117. It now only remains to ascertain who was the actual builder of the Kutb Minar. The learned Syad Ahmad assigns the original building of the basement story to Rai Pithora, and its adaptation by the Musalmâns to Kutb-uddin Aibeg. The name and titles of this King were, he thinks, engraved in the lowermost band of inscriptions, as the legible words of this band correspond with portion of Aibeg's inscription over the inner arch of the eastern gateway of the Great Mosque. The completion of the Minar he assigns to Altamish. The claim of the Hindus has already been fully discussed and disposed of as altogether baseless. That of Kutb-uddin Aibeg is founded chiefly on the fact that the pillar is called by his name, and partly on the fact that the name of Muhammad Bin Sâm is twice recorded on the lower story of the column. The occurrence of this name makes it highly probable that the name of Kutb-uddin Aibeg was also engraved on this story, as argued by Syad Ahmad. With these two names engraved on the basement story it seems only natural to conclude that the building of the pillar was begun by Aibeg during the life-time of his Suzerain, Muhammad Bin Sâm, and in full accordance with this conclusion is the statement recorded over the doorway of the second story, that the *completion* of the pillar was ordered by Altamish. Under this view, the building of the Minar may have been begun by

Aibeg in about A. D. 1200, and completed by Altamish in about 1220.

118. The other view which attributes the foundation of the pillar to Altamish is based chiefly, I believe, on the statements of *Abulfeda* and *Shams-i-Sirâj*, which are supported by the inscription of Sikandar Lodi over the entrance door of the pillar. Syad Ahmad refers to the inscription over the doorway of the second story, which records that Altamish ordered the *completion* of the Minar, as a proof that he did not commence it. But another inscription over the doorway of the fourth story seems to be equally explicit in assigning the *beginning* of the Minar to Altamish. Both Syad Ahmad and Nawâb Zia-uddin give the same translation of this inscription, namely, that "the erection of this building was ordered during the reign of Shams-uddin Altamish." It is possible, however, that the order recorded in this inscription may refer to the fourth story only, and as this limited view of its meaning will bring the two otherwise conflicting inscriptions into strict accord with each other, I think that it may be accepted as the most probable intention of the inscriber. The statements of Abulfeda, Shams-i-Sirâj, and Sikandar Lodi, all of which agree in calling this pillar the Minar of Altamish, may, perhaps, be explained as conveying only the popular opinion, and are certainly not entitled to the same weight as the two inscriptions on the basement story which record the name and titles of Muhammad Bin Sâm, the Suzerain of Kutb-uddin Aibeg, whose name is now attached to the pillar. The absence of Altamish's name in the inscription of the lower story is, I think, a conclusive proof that he himself did not claim it as his own work.

119. According to Syad Ahmad, the Emperor Altamish erected five stories in addition to the basement story, and another story was afterwards added by Firuz Shah; thus making, altogether, seven stories, of which he says that "two have fallen down and five remain to this day." But both of these statements I believe to be erroneous, for the mention of 360 steps by Abulfeda in about A. D. 1300, makes it certain that the Minar, as completed by Altamish, could not have been higher than the present one, which has 379 steps. The five stories of Altamish must therefore have included the basement story, which, although begun by Aibeg, was most probably completed by himself. In this state the Minar must have remained until the reign

of Firuz Tughlak, when, having been struck by lightning, it was repaired by that Emperor in A. H. 770, or A. D. 1368. The nature and extent of his repairs may, I think, be gathered from the inscriptions; thus, the inscription of the fifth story is placed over the doorway, and there is no record of any other Emperor on this story. I conclude, therefore, that the whole of the fifth story was rebuilt by Firuz Shah. But as there are two inscriptions of his reign recorded on the fourth story, I infer that he must have made some repairs to it also, although these repairs could not have been extensive, as the inscription over the doorway of this story belongs to the reign of Altamish. Under this view, the Kutb Minar has always consisted of five stories, from the time of its completion by Altamish in about A. D. 1220, down to the present day.

120. Of the same age as the Kutb Minar is the tomb of the Emperor Altamish, who died in A. H. 633, or A. D. 1235. It is situated just outside the north-west corner of the Great Mosque, as enlarged by Altamish himself. The interior is a square of 29½ feet, with walls 7¼ feet thick, making the exterior a square of 44 feet. The main entrance is to the east, but there are also openings to the north and south; and to the west there is a niche, such as is usually found in a small Mosque. The interior walls are decorated throughout with elaborate and highly finished ornament of great beauty. But there is no dome to the building, and as there are no ruins lying about, it seems probable that the tomb was never finished, and that we see it now just in the same state as it was left about the time of the King's death.

121. The only other buildings connected with the Great Mosque of Delhi are the beautiful south gateway of the quadrangle, and the gigantic unfinished Minar, both of which were the work of Ala-uddin Khilji, who reigned from A. D. 1296 to 1316. The south gateway is called by Syad Ahmad the *Alai Darwâza* or "Gate of Ala-uddin;" but this appellation is not known to the people. The age of the building is, however, quite certain, as the name of Ala-uddin is several times repeated in the Arabic inscriptions over three of the entrances, with the addition of his well known title of *Sikandar Sâni*, and the date of A. H. 710, or A. D. 1310. This date had already been anticipated, from the style of the building, by Mr. Fergusson, who considered the gateway as at least a century more modern than the

tomb of Altamish. The building is a square of 34½ feet inside, and 56½ feet outside, the walls being 11 feet thick. On each side there is a lofty doorway, with a pointed horse-shoe arch; the outer edge of the arch being fretted, and the underside panelled. The corners of the square are cut off by bold niches, the head of each niche being formed by a series of five pointed horse-shoe arches, lessening in size as they retire towards the angle. The effect of this arrangement is massive and beautiful, and justly merits the praise which Mr. Fergusson* has bestowed upon it, as "more simply elegant than any other Indian example with which he was acquainted." The interior walls are decorated with a chequered pattern of singular beauty. In each corner there are two windows, of the same shape and style as the doorways, but only one-third of their size. These are closed by massive screens of marble lattice-work. The exterior walls are panelled and inlaid with broad bands of white marble, the effect of which is certainly pleasing. The walls are crowned by a battlemented parapet and surmounted by a hemispherical dome. For the exterior view of the building this dome is, perhaps, too low, but the interior view is perfect, and, taken altogether, I consider that the gateway of Ala-uddin is the most *beautiful* specimen of Pathân architecture that I have seen.

122. The unfinished Minar of Ala-uddin stands due north from the Kutb Minar at a distance of 425 feet. This massive pillar is built wholly of the rough shapeless grey stone of the country, and the surface is so uneven, that there can be no doubt it was the Architect's intention either to have faced it with red stone, or to have covered it with plaster. The Minar stands upon a plinth 4½ feet in width, and the same in height, which is raised upon a terrace 21 feet in breadth and 7½ in height. The rough mass of the superstructure is 257 feet in circumference, and 82 feet in diameter; but with a facing of red stone, this diameter would have been increased to at least 85 feet, or nearly double that of the Kutb Minar, as is usually stated by the people. The entrance is on the east side, and on the north, at same height, there is a window intended to light the spiral stair-case. But the steps were never commenced, and there is only a circular passage 9 feet 9 inches wide around the central pillar, which is 26 feet in diameter. The thickness of the outer wall is 18 feet 3 inches, the

* Handbook of Architecture, I. 433

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whole pillar being 82 feet in diameter, as noted above. The total height of the column, as it now stands, is about 75 feet above the plinth, or 87 feet above the ground level. The outer face of the wall is divided into 32 sides of 8 feet and ½ inch each. The form of each face or flute is difficult to describe, but it may be likened to the shape of a crown work in fortification, or to that of an old Roman M, with shallow body and long widely-splayed limbs. I think it probable that the central angle of each face, as it now exists in the rough stone, would have been modified in the red stone facing into a shallow curved flute. The flutes would have been 4 feet wide and 4 feet apart, with a deep angle between them. The plinth is also divided into 32 straight faces, or projections, which are separated by the same number of depressions of equal breadth, the whole being exactly like a gigantic cogwheel. Syad Ahmad states that the building of this Minar was commenced in A. H. 711, or A. D. 1311; but as Ala-uddin did not die until A. D. 1316, the work was probably stopped some time before the end of his reign. I suspect, indeed, that the work was actually stopped in the following year, as I find from Ferishta that in A. D. 1312 the King became so extremely ill, that his wife and son entirely neglected him, while his Minister exercised all the powers of the State, and even aspired to the throne. As the King never rallied, it seems not improbable that all the expensive works of Ala-uddin then in progress may have been stopped by the Minister, who wished to secure the money for himself.

Siri, or Kilah Alai.

123. The Fort of Siri, with Ala-uddin's celebrated Palace of "The thousand pillars," has been identified by Messrs. Cope and Lewis, and also by Lieutenant Burgess, the Surveyor of the ruins of Delhi, with the citadel of Rai Pithora's fort, in the midst of which stands the Kutb Minar. But in describing this fort, I have already brought forward strong reasons to show that it was the ancient *Lâlkot* of Anang Pâl, and I now propose to follow up the same argument by proving that the true site of *Siri* was the old ruined fort to the north-east of Rai Pithora's fort, which is at present called Shâhpur. A glance at the Sketch Map of the ruins of Delhi, which accompanies this account, is all that is necessary to make the following argument quite clear.

124. Sharif-uddin, the historian of Timur, describes Delhi as consisting of three cities, and as quite distinct from Firuzabad, near which the conqueror's camp was pitched. These three cities were *Siri*, *Jahân-panâh*, and *old Delhi*. To the north-east was *Siri*, the walls of which formed a circle, and to the south-west was *old Delhi* similar in form, but larger than *Siri*, and the space between the two forts, which was much larger than old Delhi, was *Jahân-panâh*. The relative sizes and positions of the three cities are here so accurately described, that it is quite impossible to mistake them. *Siri* answers exactly to *Shâhpur*, not only in size and position, but also in shape; for, though not circular, it is certainly oval. To the south-west of Shâhpur lies the fort of Rai Pithora, which therefore corresponds exactly with the old Delhi of Sharif-uddin, both in its size and in its position, and somewhat also in its form, which may be described as an oblong square with the corners cut off. The name of old Delhi was appropriately applied to the fort of Rai Pithora as by far the most ancient of the three cities. Between Siri and old Delhi was *Jahân-panâh*, a name which is still applied to the old walled city between Shâhpur and Rai Pithora's fort; and as the size of this city is more than double that of Rai Pithora's fort, there can be no doubt whatever of its identity with the Jahân-panâh of former days.

125. I now turn to Ferishta's account of Turghai Khan's invasion of India during the reign of Ala-uddin, the founder of Siri. In A. H. 703, or A. D. 1303, the Mogul Chief reached Delhi with 120,000 horse, and encamped on the bank of the Jumna, most probably about the spot where Humayun's tomb now stands, as that is the nearest point of the river towards old Delhi. "The King," as Ferishta relates, "was in no condition to face the enemy on equal terms, and therefore contented himself with entrenching his Infantry on the plain beyond the suburbs till he could collect the Forces of the distant districts." But after the lapse of two months, the Mogul Troops were seized with a panic, and retreated precipitately to their own country. The historian then relates that "Ala-uddin, relieved from the perils of this invasion, caused a Palace to be built *on the spot where he had entrenched himself*, and directed the citadel of old Delhi to be pulled down and built anew." Now the spot where the King entrenched himself may be fixed with some precision, partly from Ferishta's description that it was outside the suburbs, and

partly from the strategical consideration that it must have been on the north-east side facing towards the enemy, and covering the city. On this side the suburbs of old Delhi extended for a considerable distance. We know, also, that they were without walls, because the Moguls plundered them during their stay, and because they were afterwards enclosed by Muhammad Tughlak, when they received the separate name of Jahân-panâh. Immediately in front of these suburbs, and facing towards the enemy, is the old ruined fort of Shâhpur, and inside the western half of this fort there still exist the remains of a very extensive Palace. This Palace I believe to be the celebrated *Kasr-Hazâr-Situn*, or "Palace of the thousand pillars," which Ala-uddin built on the spot where he had entrenched himself. This Palace was also called *Hazar Minar*, or "the thousand minarets."

126. There is yet one more evidence which I can bring forward in favour of the identification of *Siri* with Shâhpur. In the Ayin Akbari it is related that Shir Shah destroyed the city built by Ala-uddin, which was called *Siri*, and founded another. Again in the Araish-i-Mahfil it is recorded that Shir Shah pulled down the *Koshak Subz*, or the "Green Palace," and built a new city. Syad Ahmad repeats the same story, adding that the materials of the old fort and Palace of *Siri* were used in the construction of the new fort of *Shir-Shah-Kot*. From these accounts it is quite certain that *Siri* cannot be identified with the citadel that surrounds the Kutb Minar, for the walls of *Siri* were pulled down, and the materials removed by Shir Shah, while the walls of the Kutb Minar Citadel are still standing. And further it seems almost certain that Shâhpur must be *Siri*, because of its vicinity to the new site of Shir Shah's fort, for it is hardly possible to believe that the King would have brought his building stones from the Kutb Minar, a distance of 7 miles, when he could have obtained them from Shâhpur, which is only half the distance. That he did obtain his materials from the latter place, and not from the former, may be regarded as almost certain, for the very sufficient reason that the walls of Shâhpur have actually been removed, while those of the Kutb Citadel are still standing.

127. The only evidence in favour of the identification of Siri with the Kutb Citadel is the fact which Ferishta records, that the citadel of old Delhi was re-built by Ala-uddin, and the existence near the Kutb Minar of the remains of an old Palace, which still bears this

King's name. As the historian does not mention the new city of Siri, it would seem to have been inferred that the *re-building* of the citadel of old Delhi was only a perverted account of the founding of the new city of *Siri*. I see no reason, however, why Ferishta's statement should not be accepted exactly as it stands, for, on summing up the works of Ala-uddin, he records* that, during his reign, "*Palaces*, Mosques, Universities, Baths, Mausolea, *Forts*, and all kinds of public and private buildings, seemed to rise as if by magic." As from this account it would appear that Ala-uddin built more than one fort, and founded more than one Palace, I see no difficulty in assigning to him the building of the Palace near the Kutb Minar, and the re-building of the citadel of old Delhi, as well as the founding of the new city of Siri and its celebrated Palace of *Kasr-Hazâr-Situn*, or "the thousand pillars." Much stress has been laid upon another statement made by Ferishta regarding the meeting of Nusrat Shah and Mallu Khan in the Palace of Siri at the tomb of Khwaja Kutbuddin Bakhtiar Kaki. But this statement, and others connected with the confused history of this period, only shows that Ferishta was not well acquainted with the topography of ancient Delhi. Thus he records that Mahmud Shah occupied *old Delhi*, and Nusrat Shah held *Firuzabad*, while *Siri* was in the possession of Mallu Khan and other Nobles who professed neutrality. He then relates that Mallu made overtures to Nasrat, who came to Siri, when a mutual compact was sworn at the tomb of Khwaja Kutbuddin in *Siri*. But as this tomb is close to the Kutb Minar, and within the walls of the citadel of old Delhi, which was held by Mahmud, it would have been impossible for Nusrat and Mallu to have met there. I would suggest that the place of meeting may have been the shrine of the famous Saint called *Chirâgh Delhi*, or the "Lamp of Delhi," which is just outside the south-east corner of Shâhpur or Siri.

128. The next monuments in point of time are the grand old fort of Tughlakabad, with the tomb of its founder Tughlak Shah, and the castle of his son Muhammad, called Adilabad, and the city named Jahân-panâh.

129. The fort of Tughlakabad may be described, with tolerable accuracy, as a half hexagon in shape, with three faces of rather more than three quarters of a mile in length each, and a base of one mile

* Brigga,—I. 355.

and a half, the whole circuit being only 1 furlong less than 4 miles. The fort stands on a rocky height, and is built of massive blocks of stone, so large and heavy, that they must have been quarried on the spot. The largest stone which I observed measured 14 feet in length by 2 feet 2 inches and 1 foot 10 inches in breadth and thickness, and must have weighed rather more than 6 tons. The short faces to the west, north, and east, are protected by a deep ditch, and the long face to the south by a large sheet of water, which is held up by an embankment at the south-east corner. On this side the rock is scarped, and above it the main walls rise to a mean height of 40 feet, with a parapet of 7 feet, behind which rises another wall of 15 feet, the whole height above the low ground being upwards of 90 feet. In the south-west angle is the citadel, which occupies about one-sixth of the area of the fort, and contains the ruins of an extensive Palace. The ramparts are raised, as usual, on a line of domed rooms, which rarely communicate with each other, and which, no doubt, formed the quarters of the Troops that garrisoned the fort. The walls slope rapidly inwards, even as much as those of Egyptian buildings. The rampart walls are pierced with loop-holes, which serve also to give light and air to the soldiers' quarters. The parapets are pierced with low sloping loop-holes, which command the foot of the wall, and are crowned with a line of rude battlements of solid stone, which are also provided with loop-holes. The walls are built of large plainly dressed stones, and there is no ornament of any kind. But the vast size, the great strength, and the visible solidity of the whole give to Tughlakabad an air of stern and massive grandeur that is both striking and impressive.

130. The fort of Tughlakabad has 13 gates, and there are three inner gates to the citadel. It contains 7 tanks of water, besides the ruins of several large buildings, as the Jâma Masjid and the Birij Mandir. The upper part of the fort is full of ruined houses, but the lower part appears as if it had never been fully inhabited. Syad Ahmad states that the fort was commenced in A. D. 1321 and finished in 1323, or in the short period of two years. It is admitted by all that the work was completed by Tughlak himself; and as his reign lasted for only four years, from 1321 to 1325, the building of the fort must have been pushed forward with great vigour.

131. The fine tomb of Tughlak Shah was built by his son Muhammad, who is not without suspicion of having caused his father's

death. In A. D. 1304, during the reign of Ala-uddin, a second army of 4,000 Mogul horse burst into the Punjab and plundered the country as far as Amroha, in Rohilkhand, but they were defeated with great slaughter by Tughlak Khan, who, as a reward for his services, was appointed Governor of the Punjab. In the following year a third Mogul Army of 57,000 horse invaded India and ravaged Multan; but this army was also defeated by Tughlak with such tremendous slaughter, that it is said only 3,000 prisoners survived the defeat. Towards the end of the same year, a fourth invasion of Moguls was driven back by the same able commander, whose very name at last inspired such terror amongst the Moguls, that the women made use of it to quiet their children, and whenever a man showed any alarm, his companions would ask, "Why do you start? Have you seen Tughlak?" From A. D. 1305 to 1321, Ghazi Beg Tughlak was Governor of the Punjab, residing sometimes at Lahore, and sometimes at Depalpur and Multan. In the fort of Multan he built a magnificent tomb for himself, which exists to this day under the title of Rokn-i-âlam, a name derived from Rukn-uddin, a very holy Saint of those days, the son of Bahâ-uddin Zakaria, more commonly called Bahâwal Hak. The people of Multan say that Muhammad presented the tomb to Rukn-uddin to secure his silence in the matter of his father's death; but agreeably to another version, Tughlak himself had incurred the displeasure of Rukn-uddin by an attempt to carry off one of his women. The angry Saint prophesied that he would never reach Delhi, and accordingly he was killed near Tilpat just as he was about to enter Delhi. There may, perhaps, be some truth in this tradition, as we learn from Ibn Batuta* that Rukn-uddin was the most noted Saint in India, and that his fame had extended even to Alexandria. Under any circumstances, it was politic to conciliate the good-will of this influential personage, and the worthy Saint himself was no doubt highly gratified with the magnificence of the gift. A similar story is current at Delhi, but the Saint of this tradition is the celebrated Nizam-uddin Auliya. The holy man had given some offence to Tughlak, who threatened to punish him when he returned to Delhi. "He will never return to Delhi," said the prophetic Saint when the threat was repeated to him. Nizam-uddin died a few years afterwards, and his tomb was erected at the

* Travels, pp. 7—101.

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expense of Muhammad, out of gratitude, as the people say, for his assistance in placing him on the throne.

132. I have referred to this earlier tomb of Tughlak, which still exists in the fort of Multan, as it is the oldest building that I have seen with the rapidly sloping walls, which form the most prominent feature of the Delhi tomb. The Rokn-i-âlam, however, is octagonal, with small towers at the angles, and is, besides, a much larger building, the inside diameter being 56 feet, and the outer diameter 76 feet. But the Multan tomb is built entirely of brick, while the Delhi tomb is built throughout of stone, and is ornamented with white marble.

133. The tomb of Tughlak Shah is situated outside the southern wall of Tughlakabad, in the midst of the artificial lake already described, and is surrounded by a pentagonal outwork, which is connected with the fortress by a causeway 600 feet in length, supported on 27 arches. The stern beauty and massive strength of this tomb have justly elicited the following warm praises of Mr. Fergusson:* "The sloping walls and almost Egyptian solidity of this Mausoleum, combined with the bold and massive towers of the fortification that surround it, form a picture of a warrior's tomb unrivalled anywhere." In this praise I heartily concur, with only one reservation in favour of the situation of the Multan tomb, which, besides being both larger and loftier, is placed on the very top of the fort close to the northern wall.

134. In plan the Delhi tomb is a square of 38½ feet interior and 61½ feet exterior dimensions. The outer walls are 38½ feet in height to the top of the battlement, with a slope of 2·333 inches per foot. At this rate the whole slope is 7½ feet in 38½ feet. The walls at base are 11½ feet thick, and at top only 4 feet, but the projecting mouldings of the interior increase the thickness of wall at the springing of the dome to about 6 or 7 feet, or perhaps more, for I had no means of making measurements so high up. The diameter of the dome is about 34 feet inside and about 44 feet outside, with a height of 20 feet. The whole height of the tomb to the top of the dome is 70 feet, and to the top of the pinnacle about 80 feet.

135. Each of the four sides has a lofty doorway in the middle, 24 feet in height, with a pointed horse-shoe arch fretted on the outer edge. There is a smaller doorway, only 5 feet 10 inches in width,

* Hand-book of Architecture, I—434.

but of the same form, in the middle of each of the great entrances, the archway being filled with a white marble lattice screen of bold pattern. The decoration of the exterior depends chiefly on difference of colour, which is effected by the free use of bands and borders of white marble, with a few panels of black marble, on the large sloping surfaces of red-stone. The horse-shoe arches are of white marble, and a broad band of the same goes completely round the building at the springing of the arches. Another broad band of white marble in upright slabs, 4 feet in height, goes all round the dome just above its springing. The present effect of this mixture of colours is certainly pleasing, but I believe that much of its beauty is due to the mellowing hand of time, which has softened the crude redness of the sand-stone, as well as the dazzling whiteness of the marble. The building itself is in very good order, but the whole interior of the little fort in which it stands is filled with filthy hovels and dirty people, and the place reeks with ordure of every description. I would strongly recommend that the whole of these hovels should be removed, and the interior of the fort cleaned. The people might be located in Tughlakabad, only 200 yards to the north, where there are hundreds of domed rooms under the ramparts, all in good repair and quite unoccupied.

135 *a.* Inside the Mausoleum there are three tombs, which are said to be those of Tughlak Shah and his queen, and their son Juna-Khan, who took the name of Muhammad when he ascended the throne. This prince was the most accomplished of all the Pathân Sovereigns of India; but he was also the most inhumanly cruel and most madly tyrannical of them all. His cruelties were witnessed by his cousin and successor Firuz Tughlak, who adopted one of the most curious expedients which the mind of man has ever conceived for obtaining the pardon of his tyrannical predecessor. I quote the words of Firuz himself, as given by Ferishta,* from the inscriptions on the Great Mosque of Firuzabad. "I have also taken pains to discover the surviving relations of all persons who suffered from the wrath of my late Lord and Master *Muhammad Tughlak*, and having pensioned and provided for them, have caused them to grant their full pardon and forgiveness to that prince in the presence of the holy and learned men of this age, whose signatures and seals, as witnesses, are affixed to the documents, the whole of which, as far as lay in my power, have been

* Briggs, I—464.

procured and put into a box, and deposited in the vault in which Muhammad Tughlak is entombed." This strange device of placing the vouchers in the tomb ready for the dead man's hand to pick up at the last day, is as bold as it is original. It would be interesting to read some of these documents, which are, in all probability, still quite safe, as all the tombs appear to be in the most perfect order.

135 *b*. Another work attributed to Muhammad Tughlak is the small detached fort of *Adilabad*, or *Muhammadabad*, near the south-east corner of Tughlakabad, with which it was once connected by a double wall along the causeway which crosses the intervening low ground. This fort is built in the same style as Tughlakabad, but it is a very small place, as the exterior line of works is not more than half a mile in circuit.

136. The greatest work of Muhammad Tughlak was the fortification of the extensive suburbs of Delhi, lying between the Hindu fort of *Rai Pithora* and the Musalmân Citadel of *Siri*. These suburbs had been plundered by the Moguls in the early part of the reign of Ala-uddin, and their unprotected state fully justified the vast outlay which the King must have incurred upon their defences. The north-west wall is 1¾ mile in length, the east wall is 1¼ mile, and the south wall is 2 miles; the whole length of the walls being just 5 miles, or somewhat more than the circuit of the fort of Rai Pithora. A considerable portion of the south wall still exists; but the east and north-west walls have been pulled down, and are now only traceable by their ruins. Sharif-uddin states that *Jahân-panâh* had 13 gates, 6 being to the north-west and 7 to the south-west.

137. Having now described the seven forts of old Delhi, I will complete the account with a detail of the number of gates in each of the forts, which together make up the total of "52 gates," as recorded by the old English traveller William Finch, and as preserved by the people down to the present day in their pithy description of *Sât-kila Bâwan-Darwâza* or "seven forts and 52 gates."

	Gates.
Lâlkot of Anang Pal	4
Fort of *Rai Pithora*	10
Total of Hindu DILLI	14 gates.

Siri of Ala-uddin	7	
Jahân-panâh of Muhammad	13	
Total of Musalmân Delhi		20 gates.
Total of old Delhi		34 gates.
Tughlakabad	13	
Citadel of ditto	3	
Adilabad	2	
Total of Tughlakabad		18 gates.
Total number		52 gates.

138. The next remains in point of antiquity are the buildings of Firuz Tughlak, who devoted the greater part of a long reign of nearly 40 years (A. D. 1351 to 1388) to the construction of numerous works, of which all but 20 palaces, 10 monumental pillars, and 5 tombs, may be called works of real public utility. Perhaps the most useful of these works was the canal which he drew from the west bank of the Jumna to supply his new Capital of Firuzabad with water. This canal having become choked from neglect, was cleared out by Ali Mardân Khan in the reign of Shahjâhân, to furnish the Mogul's new Capital with water. Having again become choked, it was once more cleared out and improved by the British Government, and it is still flowing through modern Delhi under the name of the Western Jumna Canal.

139. But the most extensive work of Firuz was the building of the new city of *Firuzabad*, with its two palaces of *Kushak Firuzabad* and *Kushak Shikâr*. Major Lewis has published much interesting information regarding this new city from the Persian of *Shams-i-Sirâj Afif*, who was contemporary with the latter end of this Emperor's reign. The new city was begun in the year A. H. 755, or A. D. 1354. It extended from the fort of Indrpat to the *Kushak Shikâr*, or hunting palace, a length of five koss. Now the distance from old Delhi is said to be also five koss, which fixes the position of the Kushak Shikâr approximately on the low range of hills to the north-west of the modern Shahjahânâbâd. But the exact position is ab-

solutely determined by the mention that the second stone pillar from Mirat was erected within the precincts of the palace, as the stone pillar is now lying in five pieces on the top of the hill close to Hindu Rao's house. *Shams-i-Sirâj* adds that the whole distance from Indrpat to the Kushak Shikâr was occupied by stone-houses, mosques, and bazars, but as the limits noted above include the whole of the modern Shahjahânâbâd, it is very improbable that the entire space was actually occupied. It is certain, however, that some considerable portion of the site of Shahjahânâbâd was well populated, as the *Kâla Masjid*, which was built in Firuz's reign, is situated at some distance within the Turkomân Gate of the present city. But even if thinly inhabited, the population of Firuzabad could not have been less than that of Shahjahânâbâd, as it was more than double its size. The number of inhabitants would therefore have been about 150,000; and if we add 100,000 more for the population of old Delhi, the total number of inhabitants in the Indian Metropolis during the reign of Firuz Shah must have amounted to one quarter of a million.

140. The palace of Firuzabad, which formed also the citadel of the new city, was strongly fortified with massive stone walls and towers of more than Egyptian slope. One of the gateways, which still exists, between the well known *Lâl Darwâza* and Firuz Shah's pillar, is a fine specimen of this bold, but rude, architecture. I believe, however that we now see these old buildings under very favourable circumstances, as time has most effectually stripped off all the flaring and gaudily coloured plaster which the taste of those days so much delighted in. I found it impossible to trace the exact size or shape of Firuz Shah's Citadel, as many of the parts in the best preservation appear to me to be of decidedly later date. Thus the Kabuli Gate or *Lâl Durwâza*, as it is now called from its red colour, is of quite a different style of architecture, and belongs, as I believe, to the time of *Shir Shah*, of whose city it formed the northern or Kabul Gate. From what I was able to trace, my opinion is, that Firuz Shah's palace was much smaller than the palace of Shahjâhân in the modern city.

141. A characteristic and favourable specimen of the architecture of this age is the *Kâla Masjid*, or "Black Mosque," which is situated inside the present city, at a short distance from the Turkoman Gate. A detailed account of this building has been published by Messrs. Lewis and Cope in the Bengal Asiatic Society's Journal for 1847,

p. 577. According to these authors, the original name was most probably the *Kalân Masjid*, or "Great Mosque." This is no doubt correct, as, when I first visited this Mosque in February 1838, the people in charge called it by that name. The common name, however, is the *Kâla Masjid*. But I am quite satisfied that this could not have been the original name, as the taste of those days would most assuredly have covered the whole building with a coating of coloured plaster. The present name of *Kâla Musjid* could not therefore have been given to it until most of the plaster had fallen off, and the bare walls of dark grey quartzose sand-stone had become visible.

142. The *Kâla Masjid* is a single room 71 feet in length by 41 feet in breadth, with two rows of four pillars each down the centre, and one row of coupled pillars along the front. These columns divide the whole area into 15 squares, each of which is covered by a small dome, the central dome being somewhat higher than the others. The walls are six feet thick, with three openings at each end, closed by massive red stone lattice-work. In front of the building there is a small open quadrangle, of the same dimensions as the interior of the Mosque, and on three sides of the quadrangle there are cloisters which are continued round the Mosque itself. The whole is enclosed by an outer wall 5 feet thick, which forms an oblong block of building 140 feet in length by 120 feet in breadth. On the outside the building consists of two stories, the middle of the lower story being a solid mass, which forms the floor of the Masjid. The four faces of the lower story have two rows of small rooms, which are now rented to petty shop-keepers. This is the invariable practice at present, and was, no doubt, the same in the time of Firuz, as the money thus obtained always formed the principal revenue, and eventually became the only income of the attendants of a Mosque. The lower story is 28 feet in height, and the upper story to the top of the battlements is 38 feet making a total height of 66 feet. The four angles are supported by small round towers with sloping walls as plain and bare as the rest of the building. The entrance to the upper story is reached by a steep flight of steps, at the head of which, but outside the general mass of building as a domed ante-room of small dimensions. The walls of the upper story are pierced with a row of arched openings which correspond in number and size with the doorways of the lower story. These were once filled with bold strong lattice-work, but many of them have been built up

The plain but massive appearance of the walls is highly suggestive of strength and solidity, which is fully borne out by the excellent state of preservation of this old building after a lapse of nearly five centuries.

142 *a*. The small fort of *Indrpat*, or *Purâna Kila*, was repaired by the Emperor Humâyun in A. H. 940, or A. D. 1533, and re-named by him *Din-panáh;* but the new name is never used, except by pedantic or bigoted Muhammadans. Within a few years, or about A. D. 1540, the works were much strengthened by *Shir Shah*, who made *Indrpat* the Citadel of his new city under the name of *Shir-garh*, by which it is now very generally known, although *Purâna Kila*, or "the old Fort," is perhaps the most common appellation. The lofty massive towers and solid walls of this old fort were strengthened by a ditch which once communicated with the Jumna. *Shir-garh* is, however, but a small place when compared with the mighty fortresses of *Rai Pithora*, *Siri*, and *Tughlakabad*, the whole circuit of its walls being only one mile and one furlong. In shape it is almost rectangular, being 3 furlongs in length by 1¼ furlong in breadth. The fort had four gates, one in the middle of each face, of which the south-west gate alone is now open. The interior is almost filled with native huts; but towering above these hovels are two fine remains of former days, a handsome massive Mosque, and a lofty octagonal building, which is still called *Shir Mandir*, or "Shir's Palace." The front of the Mosque has five horse-shoe arches, and is decorated with blue tiles and marble. The roof is formed of low flattened domes. It was built by Shir Shah in A. H. 948, or A. D. 1541, and is a favourable specimen of the architecture of the Afghan period.

143. The new city of Shir Shah called *Delhi Shirshah* extended from the neighbourhood of Humâyun's tomb on the south to Firuz Shah's Kotila on the north, near which there still exists a fine massive gateway, which was the *Kâbuli Darwâza* of the new city. It is now, however, always called the *Lâl Darwâza* or "red gate." William Finch, who entered Delhi from the Agra side on 16th January, 1611, describes the city as being two *koss* in length from gate to gate, "surrounded by a wall which has been strong, but is now ruinous." The value of Finch's *koss* is determined at rather more than 1¼ mile, by his mention that the hunting seat or *Mole* (that is, *mahal* of Firuz Shah) was two koss from the city. From the *Lâl Darwâza* to the

ruins of the Kushak Shikar the distance is 3¼ miles, and from the same point to Humâyun's tomb the distance is exactly 3 miles. But as Purchas, on the authority of other English travellers, states that Humâyun's tomb was in the city of *Shir Shah Salim*, the south gate of the city must have been somewhere beyond the tomb. The distance, however, could not have been great, as Finch mentions that "a short way from Delhi is a stone bridge of 11 arches," which is clearly the long massive bridge of 11 arches, that is now called *Bara Pul* or the "Great Bridge."* The south gate of Shir Shah's city must therefore have been somewhere between the *Bara Pul* and Humâyun's tomb. The east wall of the city is determined by the line of the high bank of the Jumna, which formerly ran due south from Firuz Shah's Kotila towards Humâyun's tomb. On the west the boundary line of the city can be traced along the bank of a torrent bed, which runs southward from the Ajmer Gate of Shahjahânâbâd, and parallel to the old course of the Jumna, at a distance of rather more than 1 mile. The whole circuit of the city walls was therefore close upon 9 miles, or nearly double that of the modern Shahjahânâbâd.

144. The small fort of *Salimgarh* was built by *Salim Shah*, the son of Shir Shah in A. H. 953, or A. D. 1546. It is situated at the north end of Shahjâhân's Palace, after the building of which it was used only as a state prison. It is not quite one quarter of a mile in length, and the whole circuit of its walls is only of three quarters of a mile. It stands on an island close to the west bank of the river, and with its lofty towers and massive walls, forms a most picturesque object from the opposite side of the Jumna. A bridge of five arches was built in front of the South Gate by Jahangir, after whom the name of the place was changed to *Nurgarh* according to Syad Ahmad. But the old name of *Salimgarh* has prevailed, and is the only one that I have ever heard used by the people, either educated or uneducated.

145. The tomb of Humâyun is too well known to need any detailed description, unless illustrated by pictorial representations, which will more appropriately accompany my proposed account of Muhammadan

* Syad Ahmad writes the name *Bârah Palah*, or the "12 arches," and states that the bridge was built in A. H 1021, which began on 23rd February, 1612. But there is probably a mistake of one year in this date, which, I think, should be A. H. 1020, or A. D. 1611. This would agree with Finch's date of 16th January, 1611, or properly 1612, according to our present reckoning.

architecture. It was built after the Emperor's death in A. H. 962, or A. D. 1554, by his widow *Hâji Begam*. It is therefore the earliest specimen of the architecture of the Mogul dynasty. The exterior form of the main body of the tomb is a square with the corners cut off, or an octagon with four long and four short faces, and each of the short faces forms one side of the four octagonal corner towers. The dome is built entirely of white marble, the rest of the building being of red sand-stone, with inlaid ornaments of white marble. In this tomb we first see towers attached to the four angles of the main building. It is true that these towers are very stout and massive, but they form an important innovation in the Muhammadan architecture of North India, which was gradually improved and developed, until it culminated in the graceful Minars of the Tâj Mahal. The intervening links are, 1st, the one storied towers of Itimâd-udaolah's tomb at Agra; 2nd, the two-storied Minars of the gateway of Akbar's tomb at Sikandra; and 3rd, the three-storied octagonal Minars of Jahangir's tomb at Lahore. In all these specimens the Minars are attached to the main building, as in the original example of Humâyun's tomb. But in the Tâj Mahal the Minars are placed at the four angles of the square terrace or plinth, on which the tomb is raised, an arrangement which was probably copied from the position of the four corner towers of the platform of Shir Shah's tomb at Sassaram. Another innovation observable in this tomb is the narrow-necked dome, which was afterwards adopted in all the Mogul buildings.

146. The citadel or palace of Shajahânâbâd was begun by the Emperor Shahjâhân in the year A. H. 1048, or A. D. 1638, but the new city was not commenced until 10 years later. The circuit of the walls of the citadel is 1½ mile, or just the same as that of the old citadel of Tughlakabad; but the new city is considerably larger than either *Tughlakabad* or *Rai Pithora's* Fort, the circuit of its walls being 5½ miles. The citadel has two gates, named the *Lahore* and *Delhi* Gates. The city has 10 gates, which are named as follows, beginning from the north-east gate near Salimgarh, which is now called the Calcutta Gate, because it leads to the bridge-of-boats over the Jumna on the line of the high road to Calcutta:—

1. Calcutta Gate to north-east.
2. Kashmir Gate to north.
3. Mori Gate to north.

4. Kâbul Gate to west.
5. Lahor Gate to west.
6. Farash Khana to south-west.
7. Ajmere Gate to south-west.
8. Turkoman Gate to south.
9. Delhi Gate to south.
10. Rajghat to east on river face.

147. The original round towers of the city defences were much enlarged and altered into angular bastions by the British Government early in the present century, and at the same time a regular glacis was formed all round the land faces of the fortress. These new works added considerably to the strength of the fortifications, as we found, to our cost, in the mutiny of 1857. The two principal streets, forming nearly a right angle, ran from the Lahor and Delhi Gates of the Citadel to the Lahor and Delhi Gates of the city. The two principal buildings in the city are the *Jâma Masjid* and the *Zínat Masjid.* The former was built by Shahjâhân in A. D. 1648, and is one of the largest and finest Mosques in India. The latter was built by *Zinat-un-nissa*, the daughter of Aurangzib, in A. D. 1710, and is a favourable specimen of the later style of Mogul architecture. Both of these buildings will be described more fully hereafter in my proposed historical account of the Muhammadan architecture of Northern India.

148. The Citadel of Shahjahânâbâd, which contained the Emperor's palace, and the two celebrated open halls or courts called the *Dewân-i-âm* and the *Dewân-i-khâs*, is too well known to require any description in this place; bnt it will be duly considered hereafter in my account of the architecture of Shahjâhân's reign. I will therefore confine my remarks at present to the short account of the two life-size statues of elephants and their riders that have lately been discovered; and which, as we learn from Thevenot and Bernier, once stood outside the Delhi Gate of the Citadel.

149. The earliest notice is that by Bernier in his description of Delhi, written on 1st July, 1663 :—" I find nothing remarkable at the entry, (of the palace,) but two great elephants of stone, which are on the two sides of one of the gates. Upon one of them is the statue of *Jamel*, the famous Raja of Chitor, and upon the other that of Patta, his brother. These are those two gallant men that, together

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with their mother, who was yet braver than they, cut out so much work for *Eckbar*, and who in the sieges of towns, which they maintained against him, gave such extraordinary proofs of their generosity that at length they would rather be killed in the out-falls with their mother than submit: and for this gallantry it is that even their enemies thought them worthy to have these statues erected for them. These two great elephants, together with the two resolute men sitting on them, do, at the first entry into this fortress, make an impression of I know not what greatness and awful terror." *Thevenot*, who was at Delhi in 1667, corroborates *Bernier's* account of these statues; but as he knew that Bernier intended to publish a description of Delhi, he merely notices the principal objects, of which the first are, "the two elephants at the entry which carry two *warriors*."

150. The next reference that I have been able to find is by Lieutenant Franklin, who visited Delhi in 1793. Stimulated by Bernier's account, he made enquiries after the statues, and was informed that "they were removed by order of Aurangzib, as savoring too much of idolatry, and he enclosed the place where they stood with a screen of red stone, which has disfigured the entrance of the palace."*

151. The romantic account of Bernier did not escape the notice of the enthusiastic historian of the Rajputs, who, after quoting the passage given above, adds,† that "the conqueror of Chitor evinced an exalted sense, not only of the value of his conquest, but of the merits of his foes, in erecting statues to the names of *Jaymal* and *Patta* at the most conspicuous entrance of his palace at Delhi." From Colonel Tod also we learn that Jaymal was a *Mertiya Râthor* of Bednor, and that *Patta* was the Chief of the *Jagâwat Sisodiyas* of Salûmbra, both being feudatories of Udaypur. Their names, he says, "are as household words inseparable in Mewâr, and will be honoured while the Rajput retains a shred of his inheritance, or a spark of his ancient recollections." On Akbar's advance to Chitor, the spiritless Rana Uday Sing retired to the western jungles, and the defence of the capital of the Sisodiyas was left to the Rathor Governor Jaymal. But the warlike spirit of the Sisodiyas was roused by the mother of the young Chief of Salûmbra, who "commanded him to put on the saffron robe and to die for Chitor." Patta was then only sixteen years old, and had lately married; but to check any compunctious reluctance which

* Asiatic Researches, IV—446. † Rajasthan, I—328.

he might feel in leaving his bride, the heroic mother armed the young wife as well as herself, and "with her descended the rock, and the defenders of Chitor saw her fall, fighting by the side of her amazonian mother." The siege still continued, but without making any progress, when, through some unfortunate delay in the springing of one of their mines, the assailants suffered a severe loss, and fled in disorder to their camp. The operations of the siege had now to be re-commenced, when a lucky shot deprived the Rajputs of their leaders. "Other mines," says Ferishta,* "were directed to be constructed, and as the works were in progress, the King, while in the batteries, observed *Jaymal*, the Governor of the place, superintending the repairs of the breaches, and giving his orders by torch-light. Akbar, seizing a matchlock from one of his attendants, fired at him, and was so fortunate as to lodge the ball in Jaymal's forehead. The spirit of the besieged fell with their Governor, and, in their despair, they performed the ceremony of the *Johar*, and putting their wives and children to death, burned them with the corpse of their Chief on a funeral pile." Akbar then entered the fort, and after a slight opposition, the capital of the Sisodiyas, for the third time, was in the hands of the Musalmâns.

152. It remains now only to consider the value of the evidence recorded in the above statements. In the first place, then, with respect to the statues, I feel quite satisfied with the testimony of Bernier. As the physician and companion of *Dânishmand Khan*, a highly respectable Nobleman of Aurangzib's Court, he was in the most favourable position for obtaining accurate information regarding the history of Akbar and his successors. I accept, therefore, without any hesitation, the account of Bernier that the statues were those of *Jaymal* and *Patta*, the two Rajput heroes who defended Chitor against Akbar. Both statues, as I have already pointed out, are those of Hindus, as their dresses open over the right breast. Admitting this much I am likewise prepared to allow that the two statues must have been erected by Akbar, as is also stated by Bernier. But, as the building of Shahjahânâbâd was not begun until seventy years after the siege of Chitor, it is absolutely certain that Akbar could not have erected the statues in front of the gate of the Delhi Palace, where they were seen

* Briggs, II—231.

by Bernier and Thevenot. What, then, was their original site? This I believe to have been the fort of Agra in front of the river gate.

153. In his account of the city of Agra, Abul Fazl,* the Minister of Akbar, states that "His Majesty has erected a fort of red stone, the like of which no traveller has ever beheld." "At the *eastern* gate are carved in stone two elephants with their riders, of exquisite workmanship." The *eastern* gate of the fort of Agra is the *river* gate, in front of which the two statues most probably remained undisturbed until the reign of Shahjâhân, who, as I presume, must have removed them to Delhi to adorn his new capital of Shahjahânâbâd. It is scarcely possible that Jahangir could have removed them to Delhi; but, if he did so, they would have been placed in front of the gate of *Salimgarh*, to which he added a bridge, at the same time changing the name of the place to *Nurgarh*, after his own title of *Nur-uddin*.

154. I have been disappointed in not finding any mention of these elephant statues in the accounts of our early English travellers. Captain Hawkins and William Finch both visited Agra in the beginning of Jahangir's reign. The former attended the Royal Durbar in the Agra Fort regularly for two years, and describes minutely the King's daily occupations, which, according to William Finch, included the witnessing of animal fights on every day except Sunday, and of executions on every Tuesday. Both the fights and the executions took place in a courtyard, or out-work, in front of the river gate. This gate is described by Finch as follows:—"The fourth gate is to the river called the *Dursane (Darsan Darwâza*, or "Gate of Sights") leading to a fair court, extending along the river, where the King looks out every morning at sun-rising. * * Right under this place is a kind of scaffold, on which the Nobles stand. * * Here, likewise, the King comes every day at noon to see the *Tumâsha* (shows) or fighting with elephants, lions, and buffaloes, and killing of deer by leopards. * * Tuesdays are peculiarly the days of blood, both for fighting beasts and killing men, as on that day the King sits in judgment, and sees it put in execution." I can only account for the silence of Finch and Hawkins by supposing that they had never seen these two remarkable elephants with their warrior riders. This, indeed, is likely enough, for the principal gate near the city, by which they would have entered the fort, is on the western side; and unless they had passed

* Ayin Akbari, II—36.

right through the fort, they could not possibly have seen the statues. There is no road along the bank of the river, and no one would think of passing in that direction without some special reason. No doubt the statues might have been seen from the opposite bank of the river, but as our travellers had no call to go there, they probably never went. Both of them came to Agra from Surat, and approached the fort on the south side; and Finch left Agra by the Delhi Road viâ Mathura without crossing the river, while Hawkins returned to Surat. Had Finch seen the statues, I feel satisfied that he would have mentioned them, as he takes notice of the elephant statue in front of the *Hâthi Paur*, or "Elephant Gate," of the Gwalior fort.

155. With regard to Akbar's object in setting up these statues, I differ altogether from Bernier and Tod. Speaking of the heroes *Jaymal* and *Patta*, the former says that "even their enemies thought them worthy to have these statues erected to them." This is somewhat amplified by Tod, who says that Akbar "evinced an exalted sense, not only of the value of his conquest, but of the merits of his foes, erecting statues to the names of Jaymal and Patta." Here we see that both Bernier and Tod were of opinion that these statues were erected by Akbar in honour of his enemies, the two Rajput heroes of Chitor. But when we remember that Akbar prided himself on having killed Jaymal with his own hand; that he gave the name of *Durust Andâz*, or "true-shooter," to his match-lock, and that both his Minister Abul Fazl and his son Jahangir make much boasting of the Emperor's lucky shot, the more natural conclusion is that the statues were erected in honour of Akbar himself. Had they been set up in honour of his gallant foes, the fact would most assuredly have been commemorated in their loudest voice by the Rajput bards; but so far was this from being the case, that Colonel Tod was entirely indebted to Bernier for this knowledge of their existence.

156. Again, when I remember that the same Akbar assumed the title of *Ghâzi* (or warrior for the faith) after putting to death with his own hand in cold blood his able, gallant, and wounded antagonist *Himu*, I cannot believe that he would afterwards erect statues in honour of any infidel Hindus, however noble in blood, or gallant in the field. When I recollect, also, the position that the statues occupied, one on each side of the Eastern Gateway of the Agra Fort, I cannot help feeling that they stood, like the two horsemen at the gate of

the Horse Guards in London, as sentinels at the gate of their imperial foe, to do honour to their conqueror. Admitting this view to be correct, I can understand why Shahjâhân removed them to Delhi to occupy the same position at the gate of his new citadel. Under the same view I can also understand why they were spared for a time by the bigotted Aurangzib. On the other hand, if we suppose with Bernier and Tod that the statues were set up in honour of the two Rajput warriors, their re-erection by Shahjâhân is to me quite incomprehensible.

157. But the question of Akbar's intention, whether it was to do honour to his foes or to himself, is one of comparatively little moment. To us the statues are simply valuable as works of art, as they are, perhaps, the only portrait statues that have been executed in India for many centuries. They are made of red sand-stone, and are of life-size, while the huge elephants on which they sit are of black marble, and the housings are decorated with white and yellow marbles. On these grounds, I conclude that the dresses and turbans of the Rajput Chiefs were coloured, while the faces and hands were most probably left of the natural reddish brown colour of the sand-stone. When set up again in the Delhi garden, I have no doubt that they will command as much attention and admiration from our own countrymen as they did two hundred years ago from the enthusiastic Frenchman Bernier.

158. There are many other remains at Delhi that are both beautiful and interesting, but as their age and origin are well known, they will naturally form a part of my proposed account of the Muhammadan architecture of Northern India. Such are the *Zinat Masjid*, more commonly called the *Kuâri Masjid*, or "Maiden's Mosque," because built by *Zinat-un-nissa*, the virgin daughter of Aurangzib; the *Kashmiri Masjid*, and the *Begam Masjid* in the city, and the tombs of *Jahânârâ Begam* and *Zib-un-nissa*, the sister and daughter of Aurangzib, outside the city. I will only notice here a grave mistake made by Mrs. Colin Mackenzie in her account of the epitaph on *Jahânârâ's* tomb. The marginal inscription records the name of "the perishable Fakir, *Jahânârâ Begam*, the daughter of Shahjâhân, and the disciple of the Saints of *Chisti*, A. H. 1094 (or A. D. 1682)." The holy men here mentioned are the Muhammadan Saints of the well known family of *Chisti*, of whom famous shrines exist at Ajmere, Fatehpur Sikri, Thânesur, and Kasûr. This notorious Muhammadan name is

changed by Mrs. Mackenzie as follows, "the humble, the transitory Jahanarâ was a disciple of the holy men of *Christ*, supposed to be Roman Priests." Jahânarâ was the builder of the Jâma Masjid at Agra, and has always been considered a most devout follower of Muhammad. Her name is still held in much veneration in Delhi for her numerous charities.

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